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# UK METEOROLOGICAL OFFICE
# GLOBAL DATA MONITORING REPORT

## March 2003

**Data Assimilation**
**Meteorological Office**
**London Rd**
**Bracknell**
**Berkshire**
**RG12 2SZ**

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## 1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Mr. D. Richardson
Observations Data Monitoring Group
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

## 2 Global Data Monitoring Statistics

### Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

### Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

### Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m $s^{-1}$ have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m $s^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

| Figure | Parameter |
|---|---|
| 4 | Mean wind vectors |
| 5 | Mean observation - background wind vector |
| 6 | Mean observation-background speed (m $s^{-1}$) |
| 7 | RMS observation-background vector (m $s^{-1}$) |

## Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

## Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

| Figure | Parameter Plotted | Layer (hPa) |
|---|---|---|
| 10 | Availability/average daily number | 701-1000 |
| 11 | Vector mean wind (observed) | 701-1000 |
| 12 | Observation-background vector wind difference | 701-1000 |
| 13 | Mean observation-background speed differences | 701-1000 |
| 14 | RMS observation-background vector difference | 701-1000 |
| 15 | Availability/average daily number | 401-700 |
| 16 | Vector mean wind (observed) | 401-700 |
| 17 | Observation-background vector wind difference | 401-700 |
| 18 | Mean observation-background speed differences | 401-700 |
| 19 | RMS observation-background vector difference | 401-700 |
| 20 | Availability/average daily number | 101-400 |
| 21 | Vector mean wind (observed) | 101-400 |
| 22 | Observation-background vector wind difference | 101-400 |
| 23 | Mean observation-background speed differences | 101-400 |
| 24 | RMS observation-background vector difference | 101-400 |

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 26 | Mean | Surface (HIRS8) |
| 27 | SD | Surface (HIRS8) |
| 28 | Mean | 700 (HIRS15) |
| 29 | SD | 700 (HIRS15) |
| 30 | Mean | 500-700 (HIRS11) |
| 31 | SD | 500-700 (HIRS11) |
| 32 | Mean | 400 (HIRS4) |
| 33 | SD | 400 (HIRS4) |
| 34 | Mean | 700 (AMSUA5) |
| 35 | SD | 700 (AMSUA5) |
| 36 | Mean | 300 (AMSUA7) |
| 37 | SD | 300 (AMSUA7) |
| 38 | Mean | 100 (AMSUA9) |
| 39 | RMS | 100 (AMSUA9) |

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 41 | Mean | Surface (HIRS8) |
| 42 | SD | Surface (HIRS8) |
| 43 | Mean | 700 (HIRS15) |
| 44 | SD | 700 (HIRS15) |
| 45 | Mean | 500-700 (HIRS11) |
| 46 | SD | 500-700 (HIRS11) |
| 47 | Mean | 400 (HIRS4) |
| 48 | SD | 400 (HIRS4) |
| 49 | Mean | 700 (AMSUA5) |
| 50 | SD | 700 (AMSUA5) |
| 51 | Mean | 300 (AMSUA7) |
| 52 | SD | 300 (AMSUA7) |
| 53 | Mean | 100 (AMSUA9) |
| 54 | RMS | 100 (AMSUA9) |

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 56 | Mean | Surface (HIRS8) |
| 57 | SD | Surface (HIRS8) |
| 58 | Mean | 700 (HIRS15) |
| 59 | SD | 700 (HIRS15) |
| 60 | Mean | 500-700 (HIRS11) |
| 61 | SD | 500-700 (HIRS11) |
| 62 | Mean | 400 (HIRS4) |
| 63 | SD | 400 (HIRS4) |
| 64 | Mean | 700 (AMSUA5) |
| 65 | SD | 700 (AMSUA5) |
| 66 | Mean | 300 (AMSUA7) |
| 67 | SD | 300 (AMSUA7) |
| 68 | Mean | 100 (AMSUA9) |
| 69 | RMS | 100 (AMSUA9) |

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

## 3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

## Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

# TABLE 1

## MONITORING OF MARINE SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for ships, fixed buoys and platforms.

**Standard of comparison** :Background field from UKMO global model.

**Observation times** :All hours

**Elements monitored**
:Mean sea level pressure (hPa).
:Wind speed (m $s^{-1}$).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. a positive bias indicates the wind observation is veered to the background.**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

**GROSS ERROR LIMIT**
:15 hPa (pressure)
:25 m $s^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

**SELECTION CRITERIA** :NOBS ≥ 20 , and one or more of the following:

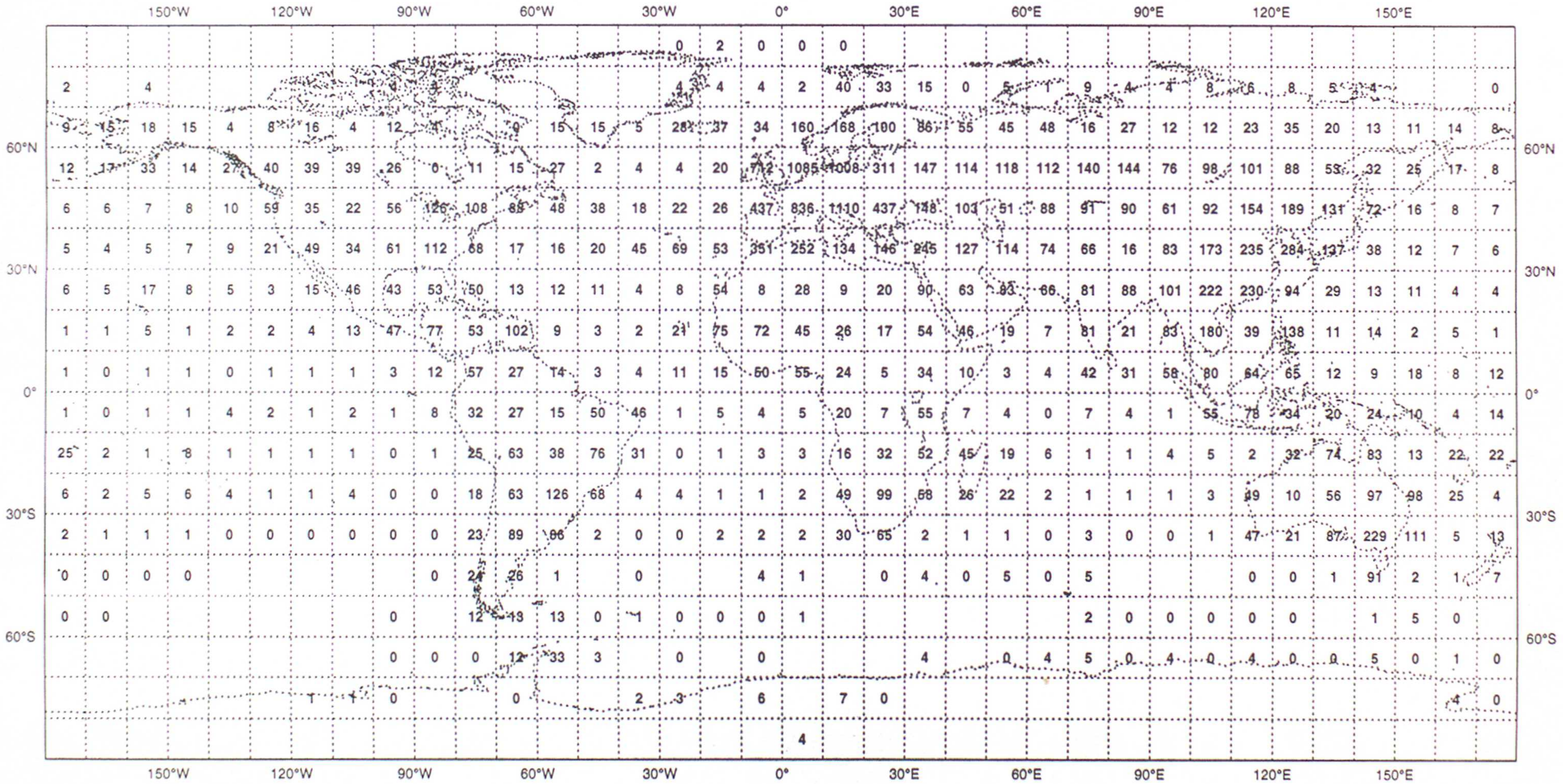
| | | |
|---|---|---|
| 1.\|bias\| | ≥ 4 hPa | (pressure), |
| | ≥ 5 m $s^{-1}$ | (wind speed), |
| | ≥ 30 degrees | (direction). |
| | ≥ 3 degrees | (sea surface temperature). |
| 2.SD | ≥ 6 hPa | (pressure), |
| | ≥ 80 degrees | (direction). |
| | ≥ 5 degrees | (sea surface temperature). |
| 3.PGE | ≥ 25 | |

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | |
| DICB | P | 55 | 0 | 85 | 3.4 | 4.2 | 5.4 |
| ELZZ4 | P | 25 | 0 | 72 | 0.9 | 5.0 | 5.0 |
| OUKN2 | P | 34 | 0 | 97 | 0.5 | -5.8 | 5.9 |
| P3YS5 | P | 45 | 0 | 0 | 1.5 | 4.5 | 4.7 |
| UDWH | P | 23 | 0 | 87 | 1.0 | 4.5 | 4.6 |
| UHLE | P | 30 | 0 | 3 | 1.7 | -8.3 | 8.4 |
| UIAG | P | 37 | 27 | 78 | 6.5 | -5.9 | 8.8 |
| UICO | P | 61 | 16 | 69 | 5.2 | -4.5 | 6.9 |
| UIZE | P | 55 | 11 | 84 | 6.1 | -6.1 | 8.6 |
| V2AR5 | P | 30 | 0 | 100 | 2.0 | -5.6 | 6.0 |
| V2MH | P | 52 | 0 | 31 | 1.5 | -4.3 | 4.5 |
| WDCJ | P | 30 | 0 | 7 | 1.8 | 5.7 | 5.9 |
| XPYM | P | 59 | 0 | 2 | 1.2 | 4.0 | 4.2 |
| 62114 | P | 43 | 0 | 47 | 0.7 | 5.9 | 6.0 |
| 62301 | P | 725 | 57 | 100 | 4.5 | 8.1 | 9.3 |
| 62414 | P | 66 | 0 | 65 | 2.6 | 4.2 | 4.9 |
| 63108 | P | 150 | 0 | 63 | 2.2 | 5.8 | 6.2 |
| WIND SPEED | | | | | | | |
| A8BJ9 | SPEED | 23 | 0 | 22 | 4.8 | 5.5 | 7.3 |
| BBXX KS0 | SPEED | 355 | 0 | 100 | 2.2 | -5.1 | 5.5 |
| C6NI3 | SPEED | 30 | 0 | 67 | 4.0 | 5.3 | 6.6 |
| C6OM8 | SPEED | 37 | 11 | 59 | 6.0 | 11.4 | 12.8 |
| DEDI | SPEED | 318 | 33 | 47 | 4.7 | 4.8 | 6.7 |
| ELRJ6 | SPEED | 30 | 0 | 13 | 3.8 | 5.0 | 6.3 |
| ELYJ3 | SPEED | 22 | 0 | 0 | 2.7 | 5.3 | 5.9 |
| ELZF9 | SPEED | 36 | 0 | 50 | 3.4 | 6.0 | 6.8 |
| KS000 | SPEED | 121 | 0 | 100 | 2.2 | -5.5 | 5.9 |
| KS006 | SPEED | 115 | 0 | 100 | 2.2 | -5.9 | 6.3 |
| KS007 | SPEED | 82 | 0 | 100 | 1.9 | -5.7 | 6.0 |
| KS025 | SPEED | 164 | 0 | 100 | 2.2 | -5.0 | 5.4 |
| OVYA2 | SPEED | 54 | 0 | 4 | 3.5 | 5.9 | 6.9 |
| OWVI2 | SPEED | 35 | 0 | 100 | 4.4 | 7.6 | 8.8 |
| P3AT9 | SPEED | 46 | 0 | 72 | 3.0 | -5.3 | 6.1 |
| UAST | SPEED | 31 | 0 | 35 | 2.4 | 5.0 | 5.5 |
| UHOM | SPEED | 49 | 2 | 14 | 3.0 | 5.0 | 5.8 |
| UIAG | SPEED | 37 | 3 | 57 | 5.6 | 6.2 | 8.3 |
| VEP717 | SPEED | 228 | 0 | 100 | 4.0 | 5.0 | 6.4 |
| VMAL | SPEED | 20 | 0 | 20 | 2.9 | 6.0 | 6.7 |
| VTXK | SPEED | 25 | 0 | 100 | 4.1 | 5.0 | 6.5 |
| V2FN | SPEED | 25 | 4 | 100 | 4.2 | 13.4 | 14.0 |
| ZCBD2 | SPEED | 28 | 0 | 64 | 5.7 | 8.4 | 10.1 |
| 3ETX6 | SPEED | 68 | 7 | 100 | 4.5 | 6.4 | 7.8 |
| 9MBR8 | SPEED | 58 | 0 | 84 | 4.2 | 10.5 | 11.3 |
| WIND DIRECTION | | | | | | | |
| C6SM7 | DIRN. | 20 | 0 | 0 | 48.9 | 43.0 | 65.1 |
| LOAI | DIRN. | 23 | 0 | 0 | 56.7 | 40.1 | 69.5 |
| 3ETX6 | DIRN. | 45 | 11 | 0 | 83.4 | -11.1 | 84.1 |
| 43008 | DIRN. | 30 | 0 | 0 | 18.2 | 75.3 | 77.5 |

| IDENTIFIER | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|
| SEA SURFACE TEMPERATURE | | | | | | | |
| CGDS | SST | 174 | 61 | 100 | 2.2 | 1.4 | 2.6 |
| CG2960 | SST | 229 | 34 | 100 | 1.6 | 1.3 | 2.0 |
| C6IZ7 | SST | 35 | 11 | 83 | 0.8 | 4.7 | 4.8 |
| C6YW | SST | 27 | 100 | 100 | | | |
| DBAI | SST | 43 | 0 | 100 | 1.3 | 3.6 | 3.9 |
| DBBX | SST | 543 | 33 | 100 | 1.3 | 0.0 | 1.3 |
| EIQN | SST | 617 | 75 | 100 | 0.6 | -0.1 | 0.6 |
| ELOG5 | SST | 49 | 0 | 90 | 1.2 | 5.3 | 5.4 |
| ELWY3 | SST | 45 | 0 | 100 | 1.0 | 3.0 | 3.2 |
| FGTO | SST | 44 | 100 | 100 | | | |
| FNJI | SST | 109 | 0 | 100 | 0.4 | 3.1 | 3.1 |
| KRPB | SST | 65 | 0 | 100 | 0.8 | -3.0 | 3.1 |
| LAJY4 | SST | 24 | 83 | 100 | 2.1 | 5.8 | 6.2 |
| LART5 | SST | 78 | 31 | 31 | 1.3 | -0.5 | 1.4 |
| PCIG | SST | 49 | 0 | 100 | 0.7 | -3.1 | 3.2 |
| P3FN9 | SST | 28 | 4 | 100 | 1.1 | 3.1 | 3.3 |
| P3FW6 | SST | 22 | 0 | 77 | 1.3 | 3.4 | 3.6 |
| SGAK | SST | 37 | 0 | 84 | 1.6 | 4.5 | 4.8 |
| SLCH | SST | 43 | 0 | 100 | 1.6 | 3.5 | 3.8 |
| UICO | SST | 59 | 75 | 75 | 0.5 | 0.6 | 0.8 |
| VCLM | SST | 89 | 44 | 100 | 1.8 | 1.4 | 2.3 |
| VGLZ | SST | 20 | 100 | 100 | | | |
| VOCJ | SST | 218 | 4 | 100 | 1.3 | 5.2 | 5.4 |
| V2PK | SST | 37 | 0 | 30 | 2.1 | 3.7 | 4.2 |
| V7DP7 | SST | 36 | 0 | 100 | 1.2 | -4.2 | 4.3 |
| WCW9126 | SST | 38 | 95 | 100 | 0.8 | -2.6 | 2.7 |
| XXUU | SST | 31 | 39 | 39 | 1.3 | 0.6 | 1.4 |
| YJQL3 | SST | 43 | 0 | 100 | 0.7 | -4.3 | 4.3 |
| ZCBO2 | SST | 47 | 0 | 36 | 2.4 | -3.2 | 4.0 |
| ZMFR | SST | 156 | 83 | 100 | 3.7 | -1.9 | 4.2 |
| 3FMM6 | SST | 42 | 0 | 100 | 1.6 | -3.6 | 3.9 |
| 41008 | SST | 624 | 0 | 100 | 1.2 | -3.7 | 3.9 |
| 41025 | SST | 29 | 0 | 55 | 0.2 | 3.1 | 3.1 |
| 46131 | SST | 652 | 100 | 100 | | | |
| 46146 | SST | 638 | 100 | 100 | | | |
| 46181 | SST | 652 | 100 | 100 | | | |
| 5WDC | SST | 33 | 33 | 45 | 1.8 | 2.3 | 2.9 |
| 9VNA | SST | 21 | 10 | 29 | 1.2 | 3.0 | 3.3 |

Figure 1. SHIP/SYNOP mean daily count. MARCH 2003
All hours
Global average number of observations in 24 hours = 20821



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | 0 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| 2 | | 4 | | | | | | | | | | | | | 4 | 4 | 4 | 2 | 40 | 33 | 15 | 0 | 5 | 1 | 9 | 4 | 4 | 8 | 6 | 8 | 5 | 4 | | | 0 |
| 9 | 15 | 18 | 15 | 4 | 8 | 16 | 4 | 12 | 4 | | 9 | 15 | 15 | 5 | 28 | 37 | 34 | 160 | 168 | 100 | 86 | 55 | 45 | 48 | 16 | 27 | 12 | 12 | 23 | 35 | 20 | 13 | 11 | 14 | 8 |
| 12 | 17 | 33 | 14 | 27 | 40 | 39 | 39 | 26 | 6 | 11 | 15 | 27 | 2 | 4 | 4 | 20 | 712 | 1085 | 1008 | 311 | 147 | 114 | 118 | 112 | 140 | 144 | 76 | 98 | 101 | 88 | 53 | 32 | 25 | 17 | 8 |
| 6 | 6 | 7 | 8 | 10 | 59 | 35 | 22 | 56 | 126 | 108 | 88 | 48 | 38 | 18 | 22 | 26 | 437 | 836 | 1110 | 437 | 148 | 103 | 51 | 88 | 91 | 90 | 61 | 92 | 154 | 189 | 131 | 72 | 16 | 8 | 7 |
| 5 | 4 | 5 | 7 | 9 | 21 | 49 | 34 | 61 | 112 | 68 | 17 | 16 | 20 | 45 | 69 | 53 | 351 | 252 | 134 | 146 | 245 | 127 | 114 | 74 | 66 | 16 | 83 | 173 | 235 | 284 | 137 | 38 | 12 | 7 | 6 |
| 6 | 5 | 17 | 8 | 5 | 3 | 15 | 46 | 43 | 53 | 50 | 13 | 12 | 11 | 4 | 8 | 54 | 8 | 28 | 9 | 20 | 90 | 63 | 83 | 66 | 81 | 88 | 101 | 222 | 230 | 94 | 29 | 13 | 11 | 4 | 4 |
| 1 | 1 | 5 | 1 | 2 | 2 | 4 | 13 | 47 | 77 | 53 | 102 | 9 | 3 | 2 | 21 | 75 | 72 | 45 | 26 | 17 | 54 | 46 | 19 | 7 | 81 | 21 | 83 | 180 | 39 | 138 | 11 | 14 | 2 | 5 | 1 |
| 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 12 | 57 | 27 | 14 | 3 | 4 | 11 | 15 | 60 | 55 | 24 | 5 | 34 | 10 | 3 | 4 | 42 | 31 | 58 | 80 | 64 | 65 | 12 | 9 | 18 | 8 | 12 |
| 1 | 0 | 1 | 1 | 4 | 2 | 1 | 2 | 1 | 8 | 32 | 27 | 15 | 50 | 46 | 1 | 5 | 4 | 5 | 20 | 7 | 55 | 7 | 4 | 0 | 7 | 4 | 1 | 55 | 78 | 34 | 20 | 24 | 10 | 4 | 14 |
| 25 | 2 | 1 | 8 | 1 | 1 | 1 | 1 | 0 | 1 | 25 | 63 | 38 | 76 | 31 | 0 | 1 | 3 | 3 | 16 | 32 | 52 | 45 | 19 | 6 | 1 | 1 | 4 | 5 | 2 | 32 | 74 | 83 | 13 | 22 | 22 |
| 6 | 2 | 5 | 6 | 4 | 1 | 1 | 4 | 0 | 0 | 18 | 63 | 126 | 68 | 4 | 4 | 1 | 1 | 2 | 49 | 99 | 68 | 26 | 22 | 2 | 1 | 1 | 1 | 3 | 49 | 10 | 56 | 97 | 98 | 25 | 4 |
| 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 89 | 86 | 2 | 0 | 0 | 2 | 2 | 2 | 30 | 65 | 2 | 1 | 1 | 0 | 3 | 0 | 0 | 1 | 47 | 21 | 87 | 229 | 111 | 5 | 13 |
| 0 | 0 | 0 | 0 | | | | | | 0 | 24 | 26 | 1 | | 0 | | | 4 | 1 | | 0 | 4 | 0 | 5 | 0 | 5 | | | | 0 | 0 | 1 | 91 | 2 | 1 | 7 |
| 0 | 0 | | | | | | | 0 | | 12 | 13 | 13 | 0 | 1 | 0 | 0 | 0 | 1 | | | | | | | 2 | 0 | 0 | 0 | 0 | 0 | | 1 | 5 | 0 | |
| | | | | | | | | 0 | 0 | 0 | 12 | 33 | 3 | | 0 | | 0 | | | | 4 | | 0 | 4 | 5 | 0 | 4 | 0 | 4 | 0 | 0 | 5 | 0 | 1 | 0 |
| | | | | | | 1 | 1 | 0 | | | 0 | | | 2 | 3 | | 6 | | 7 | 0 | | | | | | | | | | | | | | 4 | 0 |
| | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | | | |

# TABLE 2

## MONITORING OF MARINE SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - DRIFTING BUOYS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for drifting buoys.

**Standard of comparison** :Background field from UKMO global model.

**Position** :Average latitude and longitude for period.

**Observation times** : All hours

**Elements monitored**
:Mean sea level pressure (hPa).
:Wind speed (m s$^{-1}$).
:Wind direction (degrees).
:Sea surface temperature (degrees).

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ : Percentage of observations flagged excluding those with gross errors

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. a positive bias indicates the wind observation is veered to the background.**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

**GROSS ERROR LIMIT**
:15 hPa (pressure)
:25 m s$^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

**SELECTION CRITERIA** : NOBS ≥ 20 , and one or more of the following:

1.|bias|
≥ 4 hPa (pressure),
≥ 5 m s$^{-1}$ (wind speed),
≥ 30 degrees (direction).
≥ 3 degrees (sea surface temperature).

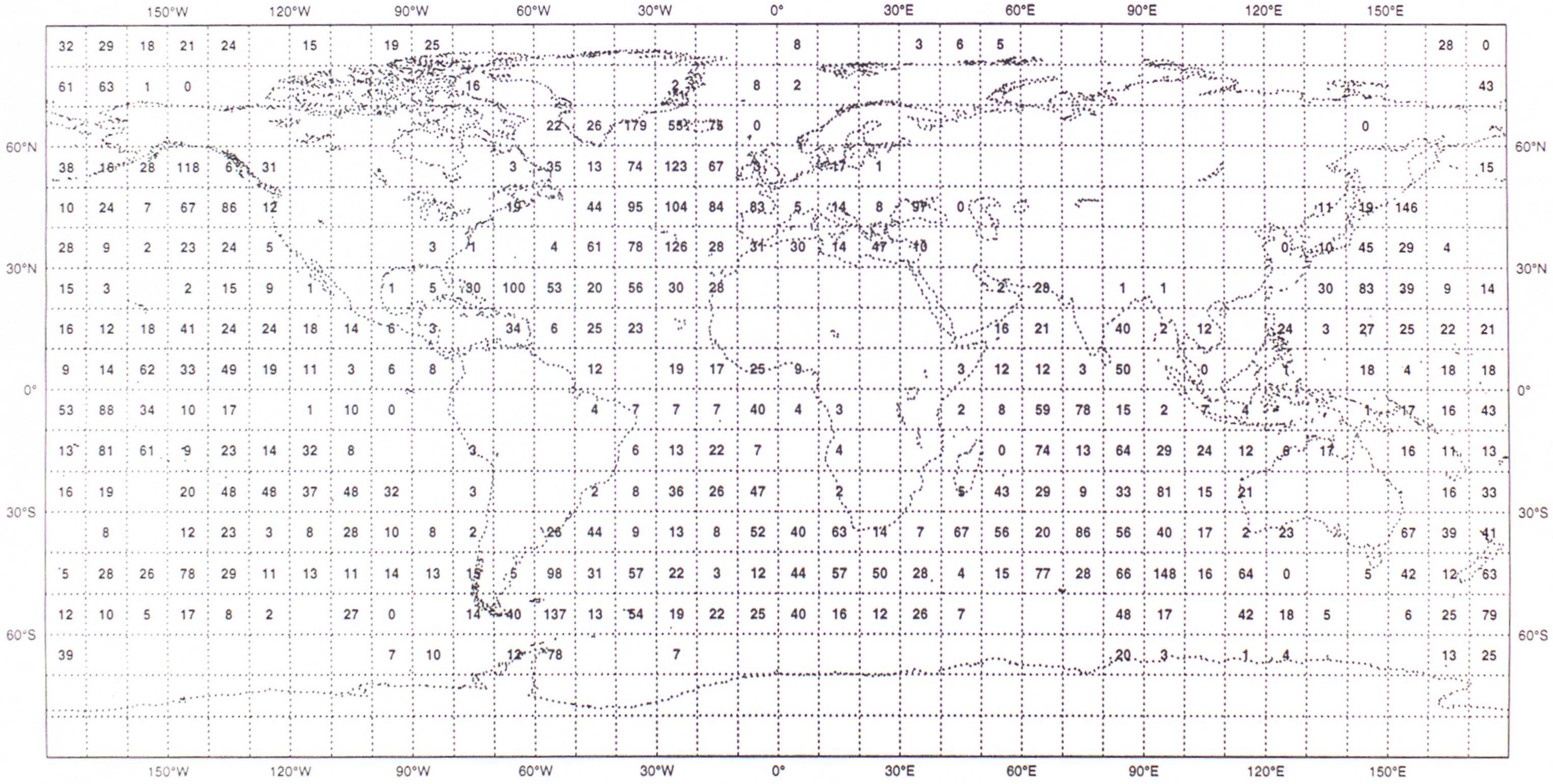
2.SD
≥ 6 hPa (pressure),
≥ 80 degrees (direction).
≥ 5 degrees (sea surface temperature).

3.PGE ≥ 25.

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s$^{-1}$**

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 17518 | -38.9 | -1.4 | P | 108 | 1 | 100 | 3.4 | 4.3 | 5.5 |
| 31970 | -34.2 | -17.0 | P | 111 | 41 | 100 | 3.2 | 0.9 | 3.4 |
| 61532 | 41.1 | 30.0 | P | 32 | 0 | 100 | 1.0 | 6.9 | 7.0 |
| 61675 | 41.5 | 29.2 | P | 317 | 31 | 33 | 0.5 | 0.6 | 0.8 |
| 62805 | 41.4 | -26.5 | P | 42 | 100 | 100 | | | |
| 66510 | 57.6 | 18.3 | P | 30 | 0 | 97 | 0.4 | -5.3 | 5.3 |
| WIND SPEED | | | | | | | | | |
| 21901 | 39.9 | 150.5 | SPEED | 985 | 30 | 100 | 2.1 | 11.8 | 12.0 |
| 21903 | 42.7 | 150.8 | SPEED | 1181 | 44 | 100 | 2.8 | 14.4 | 14.6 |
| 21904 | 47.2 | 155.7 | SPEED | 984 | 82 | 100 | 4.7 | 17.9 | 18.5 |
| 21905 | 45.6 | 155.9 | SPEED | 1266 | 29 | 100 | 2.4 | 13.2 | 13.4 |
| WIND DIRECTION | | | | | | | | | |
| 21901 | 39.9 | 150.5 | DIRN. | 814 | 37 | 0 | 42.4 | 96.0 | 104.9 |
| 21902 | 36.3 | 147.2 | DIRN. | 735 | 1 | 0 | 20.2 | 90.8 | 93.0 |
| 21903 | 42.7 | 150.8 | DIRN. | 1025 | 50 | 0 | 16.8 | 92.5 | 94.0 |
| 21904 | 47.2 | 155.7 | DIRN. | 860 | 93 | 0 | 56.2 | 87.3 | 103.8 |
| 21905 | 45.6 | 155.9 | DIRN. | 1064 | 34 | 0 | 17.1 | 91.9 | 93.5 |
| 41648 | 25.2 | -71.1 | DIRN. | 393 | 0 | 0 | 27.1 | 59.3 | 65.2 |
| 44585 | 42.1 | -69.1 | DIRN. | 119 | 1 | 0 | 24.3 | 31.7 | 39.9 |
| 44615 | 43.3 | -47.8 | DIRN. | 378 | 0 | 0 | 19.6 | -39.0 | 43.6 |
| 44620 | 44.4 | -39.3 | DIRN. | 422 | 1 | 0 | 16.2 | 40.6 | 43.8 |
| 46701 | 40.0 | -163.8 | DIRN. | 220 | 0 | 0 | 15.7 | -44.7 | 47.4 |
| SEA SURFACE TEMPERATURE | | | | | | | | | |
| 15620 | -0.7 | -43.7 | SST | 182 | 0 | 100 | 0.7 | -4.1 | 4.2 |
| 17563 | -29.0 | -4.8 | SST | 746 | 100 | 100 | | | |
| 21528 | 31.4 | 168.8 | SST | 68 | 100 | 100 | | | |
| 21902 | 36.5 | 146.6 | SST | 194 | 0 | 75 | 1.8 | -3.8 | 4.2 |
| 32526 | 9.6 | -85.7 | SST | 193 | 100 | 100 | | | |
| 33502 | -28.7 | -16.2 | SST | 101 | 0 | 100 | 0.4 | 4.7 | 4.7 |
| 44726 | 61.0 | -39.8 | SST | 1295 | 1 | 66 | 2.8 | 3.1 | 4.1 |
| 46972 | 19.5 | -145.7 | SST | 204 | 0 | 100 | 0.6 | 4.0 | 4.0 |
| 51761 | -3.5 | 179.8 | SST | 221 | 0 | 100 | 1.2 | 3.2 | 3.4 |
| 55905 | -54.7 | -66.7 | SST | 408 | 0 | 100 | 0.7 | 3.2 | 3.3 |
| 56532 | -55.5 | 83.5 | SST | 570 | 100 | 100 | | | |
| 61532 | 41.1 | 30.0 | SST | 33 | 0 | 100 | 1.6 | -3.7 | 4.0 |
| 64522 | 64.1 | -36.5 | SST | 562 | 0 | 93 | 1.6 | 5.3 | 5.5 |
| 64606 | 61.7 | -58.6 | SST | 618 | 0 | 100 | 0.4 | 4.2 | 4.2 |

Figure 2. DRIFTER mean daily count. MARCH 2003
All hours
Global average number of observations in 24 hours = 9244


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
32 29 18 21 24 15 19 25 8 3 6 5 28 0
61 63 1 0 16 2 8 2 43
22 26 179 55 75 0 0
38 16 28 118 6 31 3 35 13 74 123 67 5 17 1 15
10 24 7 67 86 12 19 44 95 104 84 83 5 14 8 97 0 11 19 146
28 9 2 23 24 5 3 1 4 61 78 126 28 31 30 14 47 10 0 10 45 29 4
15 3 2 15 9 1 1 5 30 100 53 20 56 30 28 2 28 1 1 30 83 39 9 14
16 12 18 41 24 24 18 14 6 3 34 6 25 23 16 21 40 2 12 24 3 27 25 22 21
9 14 62 33 49 19 11 3 6 8 12 19 17 25 9 3 12 12 3 50 0 1 18 4 18 18
53 88 34 10 17 1 10 0 4 7 7 7 40 4 3 2 8 59 78 15 2 7 4 17 16 43
13 81 61 9 23 14 32 8 3 6 13 22 7 4 0 74 13 64 29 24 12 8 17 16 11 13
16 19 20 48 48 37 48 32 3 2 8 36 26 47 2 5 43 29 9 33 81 15 21 16 33
8 12 23 3 8 28 10 8 2 26 44 9 13 8 52 40 63 14 7 67 56 20 86 56 40 17 2 23 67 39 41
5 28 26 78 29 11 13 11 14 13 15 5 98 31 57 22 3 12 44 57 50 28 4 15 77 28 66 148 16 64 0 5 42 12 63
12 10 5 17 8 2 27 0 14 40 137 13 54 19 22 25 40 16 12 26 7 48 17 42 18 5 6 25 79
39 7 10 12 78 7 20 3 1 4 13 25

## TABLE 3

## MONITORING OF LAND SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for synops & autosynops. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00, 06, 12, 18 UTC |
| **Elements monitored** | | :Surface pressure (hPa). |
| **Parameters monitored** | :HT(m) | :Station height (in metres) as given in WMO No. 9 Vol A |
| | :RP | :Pressure reporting practice<br>M=mean sea level pressure (hPa) reported.<br>S=Station level pressure reported.<br>8=Geopotential height (m) of 850 hPa surface reported.<br>7=Geopotential height (m) of 700 hPa surface reported. |
| | :NOBS | :Number of observations received excluding duplicates. |
| | :NGE | :Number of observations with gross errors. |
| | :PGE | :Percentage of observations with gross errors. |
| | :%REJ | :Percentage of observations flagged excluding those with gross errors. |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors. |
| **GROSS ERROR LIMIT** | :15 hPa | (pressure) |
| **SELECTION CRITERIA** | :NOBS | ≥ 20 ,and one or more of the following: |
| | 1.\|bias\| | ≥ 4 hPa |
| | 2. SD | ≥ 6 hPa |
| | 3.PGE | ≥ 25. |

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60728 | 36.4N | 10.7E | 1 | MS | 57 | 0 | 0 | 0 | 0.6 | -8.8 | 8.8 |
| 61492 | 16.1N | 13.5W | 18 | MS | 74 | 0 | 0 | 8 | 2.0 | 4.8 | 5.2 |
| 61816 | 10.9N | 14.3W | 69 | MS | 37 | 14 | 38 | 0 | 0.7 | -1.6 | 1.7 |
| 63160 | 10.4N | 45.0E | 9 | M | 26 | 1 | 4 | 12 | 1.0 | -4.7 | 4.8 |
| 63801 | 4.9S | 29.6E | 882 | S8 | 107 | 0 | 0 | 0 | 1.2 | 7.7 | 7.8 |
| 63881 | 8.0S | 31.6E | 1923 | S | 24 | 0 | 0 | 100 | 0.5 | 11.7 | 11.7 |
| 65355 | 9.8N | 1.1E | 342 | MS | 108 | 1 | 1 | 2 | 1.3 | -12.2 | 12.3 |
| 67223 | 13.1S | 39.0E | 534 | S8 | 73 | 2 | 3 | 0 | 0.9 | 11.7 | 11.7 |
| 67229 | 14.7S | 34.3E | 1270 | S8 | 30 | 29 | 97 | 0 | 0.0 | -0.2 | 0.2 |
| 67231 | 14.8S | 36.5E | 606 | S8 | 27 | 1 | 4 | 4 | 0.7 | 4.0 | 4.1 |
| 67308 | 22.1S | 31.7E | 452 | M | 26 | 26 | 100 | 0 |  |  |  |
| 68014 | 19.6S | 18.1E | 1411 | S8 | 85 | 1 | 1 | 0 | 1.0 | -6.5 | 6.6 |
| 68030 | 18.5S | 25.6E | 1071 | 8 | 80 | 0 | 0 | 4 | 2.3 | 4.5 | 5.1 |
| 68312 | 26.5S | 18.1E | 1067 | S8 | 83 | 0 | 0 | 0 | 1.0 | 5.6 | 5.7 |
| 68338 | 26.9S | 24.6E | 1234 | S8 | 61 | 61 | 100 | 0 |  |  |  |
| 68396 | 26.5S | 31.3E | 641 | S8 | 58 | 0 | 0 | 5 | 1.7 | 4.8 | 5.1 |
| 68575 | 30.0S | 30.0E | 1175 | S8 | 105 | 105 | 100 | 0 |  |  |  |

WMO REGION 2:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24688 | 63.3N | 143.2E | 741 | MS | 122 | 6 | 5 | 0 | 4.2 | 4.9 | 6.5 |
| 30554 | 54.5N | 113.6E | 995 | MS | 123 | 0 | 0 | 0 | 5.5 | 6.1 | 8.2 |
| 30967 | 49.9N | 115.8E | 623 | MS | 81 | 0 | 0 | 0 | 1.1 | -6.3 | 6.4 |
| 35358 | 49.6N | 63.5E | 123 | M | 107 | 0 | 0 | 0 | 2.7 | -4.6 | 5.3 |
| 36020 | 52.5N | 80.2E | 59 | MS | 62 | 1 | 2 | 0 | 6.5 | -7.0 | 9.6 |
| 36982 | 41.9N | 78.2E | 3635 | S7 | 122 | 0 | 0 | 0 | 0.8 | 6.5 | 6.5 |
| 40700 | 39.6N | 47.9E | 45 | MS | 90 | 2 | 2 | 3 | 1.7 | -5.4 | 5.7 |
| 40713 | 37.4N | 46.3E | 1475 | MS | 95 | 31 | 33 | 1 | 2.7 | 13.2 | 13.5 |
| 40741 | 36.5N | 61.2E | 235 | MS | 93 | 0 | 0 | 1 | 1.3 | -5.2 | 5.4 |
| 40780 | 33.6N | 46.4E | 1362 | MS | 80 | 0 | 0 | 0 | 0.9 | 5.0 | 5.1 |
| 41254 | 23.1N | 57.6E | 1755 | S8 | 59 | 59 | 100 | 0 |  |  |  |
| 41396 | 16.0N | 48.9E | 700 | MS | 57 | 1 | 2 | 0 | 1.0 | 6.9 | 7.0 |
| 43415 | 8.8N | 80.5E | 98 | S | 68 | 39 | 57 | 0 | 0.9 | 2.3 | 2.5 |
| 44265 | 46.1N | 91.5E | 1186 | MS | 115 | 0 | 0 | 1 | 1.5 | 4.9 | 5.1 |
| 44304 | 47.3N | 110.6E | 1035 | MS | 116 | 1 | 1 | 1 | 0.7 | -5.9 | 5.9 |
| 47022 | 40.8N | 128.2E | 1224 | S | 107 | 0 | 0 | 1 | 1.4 | 4.4 | 4.6 |
| 48924 | 21.1N | 101.5E | 644 | M | 30 | 0 | 0 | 0 | 1.2 | 10.9 | 11.0 |
| 48925 | 20.7N | 102.0E | 550 | S | 40 | 2 | 5 | 0 | 1.1 | -10.8 | 10.9 |
| 48938 | 19.2N | 101.7E | 326 | MS | 44 | 31 | 70 | 66 | 0.5 | 14.2 | 14.2 |
| 50727 | 47.2N | 119.9E | 1028 | MS | 123 | 0 | 0 | 0 | 0.7 | 4.6 | 4.7 |
| 51495 | 43.2N | 91.7E | 874 | M | 117 | 0 | 0 | 0 | 1.3 | 6.2 | 6.3 |
| 52866 | 36.6N | 101.8E | 2262 | S | 122 | 0 | 0 | 0 | 1.2 | -4.3 | 4.5 |
| 56287 | 30.0N | 103.0E | 629 | M | 121 | 0 | 0 | 3 | 1.8 | 4.0 | 4.4 |
| 56462 | 29.0N | 101.5E | 2994 | S | 123 | 0 | 0 | 1 | 1.4 | 8.6 | 8.7 |
| 56768 | 25.0N | 101.5E | 1773 | S | 122 | 0 | 0 | 0 | 0.7 | -4.9 | 4.9 |
| 57816 | 26.6N | 106.7E | 1074 | MS | 123 | 103 | 84 | 0 | 3.7 | -13.7 | 14.2 |

WMO REGION 3:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 80099 | 7.1N | 70.7W | 122 | MS | 41 | 0 | 0 | 0 | 1.1 | -7.4 | 7.5 |
| 82181 | 2.0S | 54.1W | 146 | MS | 47 | 0 | 0 | 2 | 1.1 | 5.4 | 5.5 |
| 82704 | 7.6S | 72.7W | 170 | MS | 72 | 0 | 0 | 0 | 1.1 | -4.5 | 4.6 |
| 83235 | 12.4S | 46.4W | 604 | MS | 70 | 0 | 0 | 1 | 1.0 | 6.7 | 6.8 |
| 83332 | 14.1S | 46.4W | 826 | MS | 74 | 47 | 64 | 0 | 0.5 | 14.4 | 14.4 |

WMO REGION 3:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 83470 | 17.9S | 50.9W | 727 | MS | 74 | 0 | 0 | 0 | 0.8 | -5.1 | 5.2 |
| 83531 | 18.6S | 46.5W | 940 | MS | 71 | 0 | 0 | 0 | 0.6 | -6.0 | 6.0 |
| 83836 | 25.5S | 50.6W | 837 | MS | 73 | 0 | 0 | 0 | 0.8 | -5.1 | 5.2 |
| 84455 | 6.5S | 76.4W | 281 | MS | 71 | 0 | 0 | 0 | 1.2 | 6.6 | 6.7 |
| 84472 | 7.1S | 78.5W | 2620 | S | 47 | 0 | 0 | 0 | 0.6 | -5.1 | 5.1 |
| 84686 | 13.6S | 72.0W | 3248 | S | 101 | 1 | 1 | 2 | 1.0 | -4.6 | 4.7 |
| 84688 | 13.7S | 73.4W | 3444 | S | 36 | 0 | 0 | 0 | 0.5 | -12.0 | 12.0 |
| 84720 | 14.9S | 75.0W | 567 | MS | 49 | 0 | 0 | 0 | 0.8 | 4.6 | 4.7 |
| 84782 | 18.1S | 70.3W | 468 | MS | 79 | 0 | 0 | 0 | 1.2 | 7.4 | 7.5 |
| 85141 | 14.5S | 67.6W | 204 | MS | 59 | 0 | 0 | 20 | 2.9 | 4.6 | 5.4 |
| 85264 | 18.5S | 64.1W | 1998 | S | 61 | 32 | 52 | 0 | 0.8 | -13.6 | 13.6 |
| 85312 | 19.8S | 63.9W | 992 | S | 48 | 2 | 4 | 0 | 1.2 | -11.2 | 11.3 |
| 85406 | 18.3S | 70.3W | 55 | M | 123 | 0 | 0 | 0 | 0.9 | 4.1 | 4.2 |
| 85432 | 22.5S | 68.9W | 2320 | S8 | 84 | 0 | 0 | 0 | 0.6 | 5.9 | 5.9 |

WMO REGION 4:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 71048 | 61.6N | 125.8W | 610 | MS | 121 | 0 | 0 | 8 | 2.0 | 6.3 | 6.6 |
| 71049 | 66.0N | 91.8W | 150 | MS | 120 | 111 | 93 | 0 | 11.5 | 8.0 | 14.0 |
| 71176 | 60.0N | 64.2W | 551 | MS | 118 | 0 | 0 | 0 | 2.0 | -4.6 | 5.0 |
| 71181 | 47.1N | 55.3W | 29 | MS | 122 | 0 | 0 | 0 | 0.7 | -6.2 | 6.2 |
| 71475 | 49.3N | 124.8W | 2 | MS | 118 | 0 | 0 | 0 | 0.9 | -8.1 | 8.1 |
| 71506 | 67.0N | 136.2W | 720 | MS | 120 | 0 | 0 | 3 | 1.8 | -5.5 | 5.8 |
| 71599 | 44.4N | 65.2W | 127 | MS | 119 | 0 | 0 | 0 | 0.8 | -4.3 | 4.4 |
| 71747 | 48.8N | 91.6W | 424 | MS | 113 | 0 | 0 | 0 | 0.8 | 4.0 | 4.1 |
| 76055 | 31.0N | 114.9W | 440 | MS | 59 | 59 | 100 | 0 | | | |
| 76118 | 30.4N | 109.7W | 1041 | MS | 21 | 0 | 0 | 0 | 0.8 | -11.2 | 11.2 |
| 76543 | 22.0N | 98.8W | 104 | MS | 40 | 0 | 0 | 5 | 1.0 | 6.5 | 6.6 |
| 76658 | 19.2N | 103.7W | 494 | MS | 22 | 0 | 0 | 0 | 0.6 | 5.7 | 5.7 |
| 76683 | 19.3N | 98.3W | 2248 | MS | 80 | 0 | 0 | 0 | 0.8 | 4.0 | 4.1 |
| 76762 | 17.5N | 99.5W | 1265 | MS | 67 | 1 | 1 | 0 | 1.0 | 5.4 | 5.5 |
| 76773 | 17.8N | 97.8W | 1650 | MS | 27 | 1 | 4 | 0 | 1.5 | 4.2 | 4.5 |
| 76845 | 16.7N | 92.6W | 2116 | MS | 73 | 0 | 0 | 1 | 1.3 | 4.2 | 4.4 |
| 76903 | 14.9N | 92.3W | 118 | MS | 61 | 0 | 0 | 0 | 0.7 | 6.1 | 6.1 |

WMO REGION 5:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 94130 | 14.8S | 131.9E | 120 | MS | 121 | 0 | 0 | 0 | 1.1 | 5.3 | 5.4 |
| 94541 | 29.8S | 151.1E | 584 | MS | 123 | 0 | 0 | 0 | 0.7 | -8.8 | 8.8 |
| 96505 | 3.7N | 115.7E | 911 | S8 | 34 | 32 | 94 | 0 | 0.2 | -0.6 | 0.6 |
| 98553 | 11.6N | 125.4E | 6 | M | 110 | 0 | 0 | 3 | 2.0 | -4.4 | 4.8 |

WMO REGION 6:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01360 | 61.9N | 7.9E | 711 | MS | 123 | 0 | 0 | 0 | 1.4 | 7.1 | 7.2 |
| 06685 | 47.0N | 9.1E | 515 | MS | 119 | 0 | 0 | 5 | 1.1 | 6.8 | 6.9 |
| 08912 | 42.9N | 0.8W | 1434 | MS | 301 | 301 | 100 | 0 | | | |
| 08922 | 42.8N | 0.2W | 1660 | MS | 90 | 90 | 100 | 0 | | | |
| 10850 | 48.8N | 10.7E | 457 | MS | 369 | 0 | 0 | 0 | 0.4 | -5.6 | 5.6 |
| 11116 | 47.5N | 10.8E | 870 | MS | 61 | 1 | 2 | 2 | 0.8 | 4.0 | 4.1 |
| 13269 | 44.3N | 19.9E | 176 | MS | 118 | 1 | 1 | 1 | 0.7 | 7.7 | 7.7 |
| 14554 | 44.9N | 18.4E | 136 | S | 61 | 3 | 5 | 0 | 0.6 | -13.7 | 13.7 |
| 14650 | 43.8N | 18.0E | 970 | S | 61 | 0 | 0 | 5 | 1.1 | -4.1 | 4.2 |
| 16344 | 39.3N | 16.4E | 1710 | S8 | 90 | 0 | 0 | 1 | 1.5 | 4.8 | 5.0 |

### WMO REGION 6:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16470 | 36.8N | 12.0E | 191 | MS | 81 | 0 | 0 | 0 | 0.6 | -4.2 | 4.2 |
| 16538 | 40.1N | 9.3E | 1022 | S | 38 | 2 | 5 | 16 | 1.8 | 8.3 | 8.5 |
| 17088 | 40.5N | 39.5E | 1219 | S8 | 121 | 0 | 0 | 7 | 1.3 | 4.0 | 4.2 |
| 17203 | 38.9N | 40.5E | 1177 | S8 | 123 | 0 | 0 | 0 | 1.5 | 5.0 | 5.2 |

### ANTARCTIC:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89004 | 71.7S | 2.8W | 815 | MS | 100 | 2 | 2 | 3 | 1.5 | -6.1 | 6.3 |
| 89253 | 63.2S | 55.4W | 75 | M | 242 | 0 | 0 | 0 | 1.6 | 4.5 | 4.8 |
| 89263 | 66.0S | 66.1W | 20 | M | 234 | 210 | 90 | 0 | 1.3 | -12.9 | 13.0 |
| 89264 | 71.4S | 68.9W | 780 | S | 265 | 0 | 0 | 0 | 1.2 | 7.1 | 7.2 |
| 89272 | 75.0S | 70.8W | 1395 | S | 242 | 242 | 100 | 0 |  |  |  |
| 89572 | 68.9S | 78.0E | 363 | S | 147 | 147 | 100 | 0 |  |  |  |
| 89610 | 65.9S | 113.1E | 90 | S | 258 | 0 | 0 | 23 | 1.2 | -7.8 | 7.9 |
| 89614 | 66.6S | 111.2E | 500 | S | 255 | 255 | 100 | 24 |  |  |  |
| 89637 | 69.5S | 130.0E | 2560 | S | 264 | 152 | 58 | 0 | 1.3 | 11.8 | 11.9 |
| 89744 | 74.0S | 43.1E | 3353 | S | 279 | 0 | 0 | 0 | 0.7 | 7.2 | 7.2 |
| 89811 | 66.7S | 112.8E | 1366 | S | 260 | 0 | 0 | 0 | 1.2 | -4.5 | 4.7 |
| 89868 | 79.9S | 170.0E | 60 | S | 297 | 0 | 0 | 0 | 1.2 | -4.1 | 4.3 |

# TABLE 4A

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Statistics for each airline carrier. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :All hours combined. |
| **Level(s) monitored** | | :300.0 - 150.0 hPa |
| **Elements monitored** | | :TEMP in °C ; WIND in m $s^{-1}$ |
| **Parameters monitored** | | |
| | :N REP. | :Number of observations received excluding duplicates. |
| | :PG | :Percentage of observations with gross errors. |
| | :PR | :Percentage of observations rejected by quality control including rejections from the duplicate check. |
| | :PC | :Percentage of observations with calm winds. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed. |
| **GROSS ERROR LIMITS** | | :10.0 °C ; 60 m $s^{-1}$ Vector Wind |
| **SELECTION CRITERIA** | | :N REP $\geq$ 20 |

**NB:** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

|  | TEMPERATURE |  |  |  |  | WIND |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAH | 3407 | 0 | 40 | 1.8 | 0.1 | 3397 | 0 | 40 | 0 | 7.0 | 0.1 |
| AAL | 6462 | 1 | 38 | 1.8 | 0.1 | 6247 | 0 | 38 | 0 | 6.5 | 0.3 |
| AAR | 1461 | 0 | 5 | 1.9 | -0.6 | 1457 | 0 | 7 | 0 | 7.7 | 0.2 |
| ACA | 3117 | 0 | 10 | 1.6 | -0.2 | 2915 | 0 | 11 | 0 | 7.7 | 0.4 |
| ACI | 60 | 0 | 27 | 0.9 | 0.3 | 60 | 0 | 28 | 0 | 7.7 | 0.4 |
| AEA | 927 | 0 | 2 | 1.6 | 0.5 | 510 | 1 | 3 | 0 | 7.3 | 0.5 |
| AEL | 915 | 0 | 8 | 2.0 | -0.3 | 728 | 0 | 9 | 0 | 8.6 | 0.7 |
| AFL | 438 | 0 | 4 | 1.9 | 0.6 | 370 | 0 | 2 | 0 | 7.4 | 0.6 |
| AFR | 2281 | 0 | 7 | 1.6 | 0.2 | 1766 | 0 | 8 | 0 | 7.7 | 0.6 |
| AIS | 497 | 0 | 8 | 1.8 | -0.4 | 452 | 0 | 9 | 0 | 9.1 | 0.5 |
| AJM | 412 | 1 | 4 | 1.6 | -0.4 | 329 | 0 | 3 | 0 | 8.1 | 1.1 |
| AJX | 256 | 0 | 7 | 1.9 | 0.1 | 260 | 1 | 6 | 0 | 7.0 | 0.0 |
| AMM | 127 | 1 | 12 | 1.6 | 0.4 | 104 | 0 | 16 | 0 | 11.6 | 2.8 |
| AMT | 1365 | 1 | 43 | 1.4 | 0.2 | 1364 | 0 | 43 | 0 | 5.9 | 0.2 |
| AMX | 293 | 2 | 4 | 1.9 | 0.0 | 213 | 0 | 4 | 0 | 9.0 | 0.5 |
| ANA | 369 | 0 | 7 | 1.8 | 0.5 | 368 | 1 | 10 | 0 | 9.0 | 0.0 |
| ANZ | 4756 | 0 | 28 | 1.2 | 0.2 | 4709 | 0 | 28 | 0 | 6.4 | 0.6 |
| ARG | 22 | 0 | 41 | 1.8 | 1.2 | 20 | 0 | 35 | 0 | 7.7 | 1.4 |
| ATN | 57 | 0 | 100 | 4.4 | -3.1 | 57 | 0 | 35 | 0 | 8.5 | 0.6 |
| AUA | 26 | 0 | 4 | 1.1 | 0.0 | 25 | 0 | 4 | 0 | 5.9 | 1.6 |
| AVA | 294 | 2 | 6 | 2.2 | 0.4 | 174 | 0 | 6 | 0 | 9.3 | -0.2 |
| AVN | 153 | 1 | 51 | 1.3 | -0.6 | 152 | 0 | 51 | 0 | 5.8 | -0.5 |
| AXF | 31 | 0 | 26 | 1.0 | 0.0 | 31 | 0 | 32 | 0 | 4.3 | -0.3 |
| AZA | 589 | 0 | 7 | 2.1 | 0.2 | 493 | 1 | 8 | 0 | 9.4 | 0.8 |
| BAL | 165 | 1 | 4 | 1.4 | -0.1 | 140 | 0 | 8 | 0 | 8.2 | 0.2 |
| BAW | 789 | 0 | 10 | 1.9 | -0.2 | 708 | 0 | 11 | 0 | 7.6 | 0.4 |
| BBR | 204 | 0 | 3 | 1.8 | 0.5 | 122 | 0 | 44 | 0 | 9.6 | -0.9 |
| BHP | 33 | 0 | 9 | 1.2 | -0.5 | 32 | 3 | 13 | 0 | 8.8 | 0.0 |
| BPA | 183 | 0 | 55 | 2.4 | 1.1 | 143 | 0 | 8 | 0 | 10.7 | -0.4 |
| BWA | 387 | 1 | 4 | 1.5 | -0.4 | 297 | 0 | 4 | 0 | 6.9 | 0.1 |
| CAL | 67 | 0 | 6 | 2.3 | 0.1 | 68 | 0 | 7 | 0 | 10.5 | 3.0 |
| CCA | 303 | 2 | 15 | 2.2 | 0.1 | 307 | 0 | 64 | 0 | 13.9 | -0.5 |
| CES | 387 | 1 | 6 | 1.9 | 0.1 | 387 | 1 | 7 | 0 | 8.2 | 0.7 |
| CFC | 31 | 0 | 10 | 1.7 | 0.6 | 30 | 0 | 23 | 0 | 11.4 | 2.5 |
| CFG | 1246 | 0 | 4 | 1.6 | -0.5 | 1035 | 0 | 5 | 0 | 7.5 | 0.3 |
| CGA | 167 | 0 | 3 | 1.2 | -0.3 | 166 | 0 | 2 | 0 | 4.0 | 0.9 |
| CGF | 56 | 0 | 2 | 1.5 | -0.6 | 55 | 0 | 2 | 0 | 4.0 | 0.4 |
| CGH | 99 | 0 | 2 | 1.7 | -0.6 | 96 | 0 | 1 | 0 | 4.4 | 0.7 |
| CKS | 323 | 0 | 37 | 1.4 | 0.3 | 326 | 0 | 37 | 0 | 5.5 | 0.5 |
| CLX | 386 | 0 | 2 | 1.5 | -0.4 | 324 | 0 | 5 | 0 | 7.3 | 0.2 |
| COA | 546 | 1 | 38 | 1.5 | -0.2 | 508 | 0 | 39 | 0 | 7.3 | 0.8 |
| CPA | 30 | 3 | 17 | 1.6 | 0.7 | 32 | 0 | 19 | 0 | 13.1 | -0.8 |
| CRL | 976 | 1 | 8 | 2.0 | 0.6 | 706 | 0 | 7 | 0 | 9.0 | 0.5 |
| CSN | 160 | 1 | 9 | 2.1 | -0.9 | 163 | 0 | 9 | 0 | 6.8 | 0.9 |
| CUB | 260 | 1 | 67 | 2.0 | 1.0 | 181 | 1 | 43 | 0 | 9.7 | 0.4 |
| DAB | 253 | 0 | 23 | 1.3 | -0.4 | 244 | 0 | 23 | 0 | 3.9 | 0.5 |
| DAI | 335 | 0 | 19 | 1.3 | 0.2 | 327 | 0 | 19 | 0 | 4.7 | 0.6 |
| DAL | 2506 | 1 | 42 | 1.5 | -0.1 | 2475 | 0 | 43 | 0 | 6.8 | 0.4 |
| DBR | 26 | 0 | 0 | 1.3 | -0.1 | 24 | 0 | 4 | 0 | 7.2 | -1.4 |
| DCE | 181 | 1 | 6 | 1.0 | -0.1 | 154 | 0 | 8 | 0 | 6.5 | 0.2 |
| DCS | 37 | 0 | 3 | 1.2 | -0.1 | 37 | 0 | 5 | 0 | 7.3 | 1.0 |
| DHL | 105 | 1 | 100 | 6.4 | -6.3 | 103 | 0 | 5 | 0 | 10.6 | 3.0 |
| DLH | 1392 | 0 | 15 | 1.5 | -0.1 | 1289 | 0 | 15 | 0 | 7.2 | 0.9 |
| EDW | 111 | 1 | 2 | 1.7 | -0.1 | 97 | 1 | 1 | 0 | 5.5 | 0.8 |
| EEZ | 32 | 0 | 13 | 1.0 | 0.1 | 32 | 0 | 16 | 0 | 5.7 | 1.1 |
| EIA | 344 | 3 | 100 | 3.6 | 1.8 | 338 | 1 | 100 | 0 | 16.8 | 3.8 |
| ELY | 124 | 0 | 2 | 1.6 | -0.1 | 123 | 0 | 5 | 0 | 8.1 | 0.4 |
| ETH | 23 | 0 | 22 | 1.5 | 0.7 | 21 | 0 | 24 | 0 | 5.0 | 0.5 |
| EVA | 226 | 0 | 9 | 2.1 | -0.7 | 243 | 0 | 7 | 0 | 7.3 | -0.1 |

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| FDX | 2075 | 1 | 42 | 1.4 | 0.2 | 2080 | 0 | 43 | 0 | 7.0 | 0.6 |
| FGS | 181 | 0 | 0 | 1.5 | 0.4 | 175 | 0 | 0 | 0 | 4.6 | 0.5 |
| FGZ | 104 | 0 | 2 | 1.2 | -0.3 | 101 | 0 | 2 | 0 | 4.4 | 0.7 |
| FIN | 213 | 0 | 3 | 1.4 | 0.2 | 199 | 0 | 4 | 0 | 5.9 | 0.7 |
| FJI | 989 | 2 | 49 | 1.3 | 0.5 | 971 | 0 | 48 | 0 | 6.4 | 1.1 |
| FOM | 578 | 0 | 31 | 1.5 | -0.2 | 570 | 0 | 32 | 0 | 5.9 | 0.4 |
| FWQ | 53 | 0 | 53 | 2.6 | 0.2 | 53 | 0 | 51 | 0 | 5.6 | -1.4 |
| GAF | 20 | 0 | 10 | 1.7 | -0.2 | 20 | 0 | 5 | 0 | 4.8 | 0.5 |
| GCO | 503 | 1 | 12 | 1.7 | 0.0 | 506 | 0 | 21 | 0 | 12.3 | 2.7 |
| GHA | 103 | 1 | 3 | 1.7 | -0.4 | 74 | 1 | 11 | 0 | 11.8 | 0.0 |
| GRL | 71 | 0 | 0 | 1.1 | 0.0 | 63 | 0 | 0 | 0 | 4.4 | -0.1 |
| GTI | 474 | 1 | 16 | 2.1 | 0.1 | 456 | 0 | 17 | 0 | 8.5 | 0.4 |
| GVA | 41 | 0 | 2 | 1.2 | 0.1 | 40 | 0 | 3 | 0 | 4.1 | 0.5 |
| GVB | 48 | 0 | 2 | 1.4 | 0.5 | 48 | 0 | 4 | 0 | 5.0 | 0.3 |
| GVF | 22 | 5 | 18 | 3.3 | -0.3 | 20 | 0 | 0 | 0 | 4.0 | 2.0 |
| GVG | 63 | 0 | 2 | 1.1 | -0.1 | 61 | 0 | 2 | 0 | 4.2 | 0.3 |
| GVH | 51 | 0 | 2 | 1.0 | -0.3 | 51 | 0 | 2 | 0 | 4.1 | 0.1 |
| GVL | 53 | 0 | 0 | 1.2 | -0.3 | 51 | 0 | 0 | 0 | 4.8 | 0.6 |
| GVR | 122 | 0 | 0 | 1.3 | -0.2 | 117 | 0 | 0 | 0 | 4.6 | 0.8 |
| GVT | 26 | 0 | 0 | 1.2 | -0.4 | 26 | 0 | 0 | 0 | 4.8 | -0.6 |
| GVW | 23 | 0 | 0 | 1.5 | -1.1 | 23 | 0 | 0 | 0 | 4.4 | 0.3 |
| GVX | 25 | 0 | 8 | 1.5 | 0.4 | 25 | 0 | 8 | 0 | 3.9 | 0.3 |
| GWW | 68 | 0 | 4 | 1.2 | -0.4 | 66 | 0 | 5 | 0 | 4.6 | 0.7 |
| GYM | 32 | 0 | 0 | 1.0 | 0.0 | 31 | 0 | 0 | 0 | 4.6 | 0.9 |
| HAL | 5095 | 0 | 38 | 1.4 | -0.2 | 5057 | 0 | 38 | 0 | 6.7 | 0.5 |
| HRH | 93 | 0 | 67 | 1.4 | -0.2 | 93 | 0 | 67 | 0 | 6.1 | 1.6 |
| IBE | 3092 | 1 | 6 | 1.7 | 0.4 | 1885 | 0 | 7 | 0 | 8.5 | 0.6 |
| ICE | 738 | 0 | 3 | 1.5 | -0.2 | 705 | 0 | 2 | 0 | 6.9 | 0.8 |
| IRL | 27 | 0 | 7 | 2.4 | 1.2 | 26 | 0 | 8 | 0 | 7.0 | 1.0 |
| IWD | 254 | 1 | 4 | 1.5 | 0.0 | 170 | 0 | 6 | 0 | 9.5 | 0.1 |
| JAA | 155 | 1 | 3 | 2.1 | 1.3 | 154 | 1 | 1 | 0 | 7.1 | 2.7 |
| JAL | 2788 | 0 | 5 | 1.8 | 0.2 | 2762 | 0 | 5 | 0 | 7.7 | 0.3 |
| JAZ | 1186 | 0 | 4 | 1.6 | 0.3 | 1186 | 0 | 5 | 0 | 8.1 | 0.1 |
| JBU | 41 | 0 | 0 | 1.0 | -0.3 | 42 | 0 | 2 | 0 | 7.4 | 0.1 |
| KAI | 28 | 0 | 43 | 2.5 | 2.2 | 28 | 0 | 46 | 0 | 10.3 | 0.7 |
| KAL | 3123 | 1 | 12 | 1.9 | -0.3 | 3106 | 0 | 12 | 0 | 7.7 | 0.4 |
| KLM | 1981 | 0 | 4 | 1.7 | 0.2 | 1623 | 0 | 5 | 0 | 7.7 | 0.5 |
| LAN | 529 | 0 | 4 | 1.7 | -0.1 | 522 | 0 | 4 | 0 | 6.0 | 0.9 |
| LAP | 62 | 0 | 48 | 2.9 | 1.3 | 59 | 0 | 46 | 0 | 7.5 | 2.3 |
| LDA | 29 | 0 | 3 | 1.2 | -0.2 | 21 | 0 | 14 | 0 | 10.5 | 0.8 |
| LDI | 628 | 0 | 3 | 1.7 | -0.7 | 440 | 0 | 4 | 0 | 9.3 | 0.2 |
| LOT | 94 | 2 | 3 | 1.5 | -1.0 | 93 | 0 | 5 | 0 | 7.0 | 0.1 |
| LTU | 781 | 2 | 5 | 1.6 | 0.0 | 633 | 0 | 4 | 0 | 7.6 | 0.5 |
| LXR | 37 | 3 | 14 | 2.5 | 0.6 | 31 | 0 | 13 | 0 | 9.3 | 1.3 |
| MAS | 341 | 0 | 5 | 1.8 | -0.3 | 351 | 0 | 5 | 0 | 8.0 | -0.5 |
| MON | 119 | 0 | 1 | 1.5 | 0.0 | 99 | 0 | 2 | 0 | 6.7 | 0.5 |
| MPD | 308 | 0 | 5 | 1.9 | 0.5 | 201 | 0 | 5 | 0 | 7.4 | 0.4 |
| MPH | 588 | 0 | 3 | 1.8 | -0.7 | 543 | 0 | 3 | 0 | 8.2 | 0.4 |
| MYT | 263 | 1 | 6 | 2.0 | 0.3 | 207 | 0 | 7 | 0 | 9.0 | 0.1 |
| NAO | 245 | 0 | 42 | 1.4 | -0.4 | 249 | 0 | 42 | 0 | 7.4 | -0.8 |
| NCA | 1144 | 0 | 3 | 1.6 | -0.1 | 855 | 0 | 5 | 0 | 8.0 | 0.7 |
| NWA | 9756 | 1 | 11 | 1.7 | 0.0 | 9731 | 0 | 11 | 0 | 7.3 | 0.4 |
| NZL | 3398 | 0 | 11 | 1.2 | 0.2 | 3398 | 0 | 11 | 0 | 5.1 | 0.2 |
| OAE | 638 | 1 | 37 | 1.4 | -0.4 | 633 | 0 | 100 | 0 | 8.0 | 0.8 |
| OYK | 21 | 0 | 67 | 0.8 | -0.2 | 21 | 0 | 67 | 0 | 3.8 | 0.6 |
| PAC | 622 | 0 | 12 | 1.7 | -0.2 | 619 | 0 | 12 | 0 | 7.3 | 0.3 |
| PAL | 1221 | 0 | 11 | 1.6 | -0.2 | 1186 | 1 | 12 | 0 | 8.9 | 0.4 |
| PAO | 311 | 0 | 58 | 1.8 | 1.3 | 309 | 0 | 59 | 0 | 7.0 | 0.4 |
| PUA | 41 | 0 | 34 | 1.8 | 1.0 | 38 | 0 | 39 | 0 | 14.1 | 1.6 |

|  | TEMPERATURE |  |  |  |  | WIND |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| QFA | 2897 | 0 | 45 | 1.3 | 0.4 | 2872 | 0 | 45 | 0 | 5.8 | 0.4 |
| RAM | 226 | 0 | 6 | 2.0 | 0.0 | 125 | 0 | 8 | 0 | 12.5 | 1.6 |
| RCH | 840 | 2 | 18 | 2.1 | 0.2 | 748 | 0 | 100 | 0 | 10.4 | 1.6 |
| RJA | 23 | 0 | 4 | 2.1 | -0.5 | 23 | 0 | 0 | 0 | 6.1 | 1.0 |
| RZO | 392 | 2 | 5 | 1.9 | -0.3 | 198 | 1 | 4 | 0 | 7.5 | 0.3 |
| SAA | 373 | 1 | 3 | 1.7 | -0.8 | 300 | 1 | 6 | 0 | 10.2 | 0.8 |
| SEU | 193 | 1 | 4 | 1.9 | -0.1 | 180 | 1 | 5 | 0 | 7.8 | 1.0 |
| SIA | 289 | 0 | 2 | 1.3 | 0.3 | 290 | 0 | 2 | 0 | 5.3 | 0.0 |
| SLR | 305 | 0 | 7 | 1.3 | 0.1 | 289 | 1 | 8 | 0 | 7.7 | 0.4 |
| SOO | 27 | 0 | 15 | 1.7 | 1.4 | 31 | 0 | 13 | 0 | 6.4 | -0.6 |
| SQC | 53 | 0 | 6 | 1.2 | 0.1 | 53 | 0 | 8 | 0 | 5.8 | -0.2 |
| SSV | 29 | 0 | 0 | 1.4 | 0.2 | 31 | 0 | 0 | 0 | 6.1 | 1.4 |
| SVA | 40 | 3 | 8 | 1.5 | -0.2 | 47 | 0 | 4 | 0 | 6.4 | 0.2 |
| TAG | 37 | 0 | 27 | 2.0 | -0.6 | 36 | 0 | 31 | 0 | 5.9 | 0.2 |
| TAP | 539 | 0 | 3 | 1.4 | -0.5 | 199 | 1 | 8 | 0 | 8.8 | 0.3 |
| THA | 127 | 2 | 4 | 1.6 | 0.0 | 128 | 0 | 5 | 0 | 7.6 | -0.5 |
| THT | 152 | 0 | 37 | 1.5 | 0.2 | 136 | 2 | 38 | 0 | 8.6 | 1.9 |
| TPA | 49 | 0 | 0 | 1.3 | 0.5 | 38 | 0 | 5 | 0 | 9.4 | -0.1 |
| TSC | 85 | 2 | 16 | 2.3 | -0.4 | 71 | 0 | 17 | 0 | 6.1 | 1.5 |
| UAL | 149424 | 0 | 87 | 1.2 | -0.3 | 149539 | 0 | 87 | 0 | 5.2 | 0.6 |
| UPS | 1854 | 1 | 51 | 1.5 | -0.1 | 1822 | 0 | 51 | 0 | 6.9 | 0.5 |
| USA | 216 | 1 | 5 | 1.7 | 0.0 | 189 | 0 | 3 | 0 | 7.3 | 0.0 |
| VIR | 291 | 0 | 4 | 1.6 | -0.4 | 268 | 0 | 6 | 0 | 7.5 | 0.9 |
| VPB | 23 | 0 | 17 | 1.5 | 0.6 | 22 | 0 | 23 | 0 | 8.9 | 1.1 |
| VRG | 207 | 3 | 19 | 2.3 | 1.0 | 206 | 0 | 47 | 0 | 9.8 | 0.5 |
| VVJ | 53 | 0 | 19 | 1.9 | -0.8 | 67 | 0 | 18 | 0 | 7.4 | 1.7 |
| VVR | 20 | 5 | 30 | 2.3 | 1.8 | 20 | 0 | 25 | 0 | 5.5 | -0.5 |
| WOA | 469 | 0 | 6 | 1.5 | 0.0 | 457 | 0 | 10 | 0 | 9.3 | 1.3 |
| XAS | 23 | 0 | 35 | 2.7 | -1.9 | 22 | 0 | 36 | 0 | 6.1 | 3.3 |
| YSS | 44 | 2 | 2 | 1.3 | 0.6 | 31 | 0 | 0 | 0 | 6.5 | 1.7 |
| 9VS | 153 | 0 | 3 | 1.4 | -0.5 | 143 | 0 | 2 | 0 | 4.5 | 0.5 |
| AR | 1413 | 0 | 100 | 2.9 | 2.7 | 1405 | 0 | 5 | 0 | 5.8 | 1.4 |
| AU | 39656 | 0 | 10 | 1.2 | 0.5 | 39650 | 0 | 10 | 0 | 5.1 | 0.5 |
| EU | 222546 | 0 | 30 | 1.2 | 0.2 | 222545 | 0 | 30 | 0 | 4.4 | 0.4 |
| KL | 4068 | 0 | 9 | 1.3 | 0.6 | 4046 | 0 | 9 | 0 | 5.7 | 0.6 |
| LH | 1401 | 0 | 26 | 1.6 | 1.2 | 1391 | 0 | 26 | 0 | 5.2 | 1.0 |
| LN | 21 | 0 | 48 | 1.8 | 0.5 | 21 | 0 | 52 | 0 | 14.0 | -0.5 |
| MK | 4677 | 0 | 71 | 1.8 | 1.4 | 4644 | 0 | 7 | 0 | 6.3 | 1.3 |
| SA | 2222 | 0 | 7 | 1.8 | 1.5 | 2211 | 0 | 7 | 0 | 5.9 | 0.8 |
| SV | 1417 | 0 | 15 | 2.1 | 2.0 | 1403 | 0 | 15 | 0 | 5.3 | 1.1 |
| TN | 76 | 1 | 29 | 1.9 | 0.1 | 76 | 0 | 32 | 0 | 10.3 | -0.9 |
| N | 3044 | 0 | 19 | 1.8 | 0.1 | 2979 | 0 | 18 | 0 | 5.9 | 0.6 |
| US ACARS | 832240 | 0 | 62 | 1.5 | 0.2 | 832233 | 0 | 61 | 0 | 5.6 | 0.8 |

## TABLE 4B

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Statistics for each airline carrier. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :All hours combined. |
| **Level(s) monitored** | | :1000.0 – 300.1 hPa |
| **Elements monitored** | | :TEMP in °C ; WIND in m $s^{-1}$ |
| **Parameters monitored** | | |
| | :N REP. | :Number of observations received excluding duplicates. |
| | :PG | :Percentage of observations with gross errors. |
| | :PR | :Percentage of observations rejected by quality control including rejections from the duplicate check. |
| | :PC | :Percentage of observations with calm winds. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed. |
| **GROSS ERROR LIMITS** | | :10.0 °C ; 60 m $s^{-1}$ Vector Wind |
| **SELECTION CRITERIA** | | :N REP $\geq$ 20 |

**NB :** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

|  | TEMPERATURE |  |  |  |  | WIND |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAH | 22 | 5 | 36 | 2.6 | -1.5 | 21 | 0 | 19 | 0 | 7.3 | 0.9 |
| AAL | 235 | 1 | 40 | 1.2 | -0.2 | 224 | 0 | 40 | 0 | 8.3 | 0.7 |
| ACA | 38 | 0 | 26 | 0.9 | 0.5 | 40 | 0 | 25 | 0 | 6.8 | 0.8 |
| AFR | 122 | 0 | 6 | 1.9 | 0.1 | 103 | 0 | 2 | 0 | 6.4 | 1.2 |
| AMT | 42 | 0 | 33 | 1.2 | 0.0 | 40 | 0 | 35 | 0 | 5.7 | 2.0 |
| ANZ | 187 | 4 | 18 | 1.1 | 0.0 | 189 | 0 | 17 | 0 | 6.8 | 0.6 |
| APW | 26 | 4 | 4 | 2.1 | -1.8 | 26 | 0 | 12 | 0 | 13.6 | 3.1 |
| ATN | 71 | 1 | 100 | 3.9 | -2.4 | 71 | 0 | 21 | 0 | 12.3 | 1.3 |
| AXF | 50 | 0 | 64 | 0.8 | -0.1 | 47 | 0 | 64 | 0 | 4.8 | -0.5 |
| AZA | 24 | 0 | 4 | 2.4 | -0.2 | 23 | 0 | 4 | 0 | 7.5 | 1.1 |
| BAF | 26 | 0 | 4 | 1.7 | 0.4 | 25 | 0 | 8 | 0 | 7.7 | 3.2 |
| CFC | 36 | 0 | 6 | 1.2 | 0.1 | 30 | 0 | 7 | 0 | 6.4 | 0.6 |
| CFG | 77 | 0 | 4 | 1.2 | -0.6 | 69 | 0 | 6 | 0 | 8.6 | -0.4 |
| CIU | 32 | 9 | 19 | 2.3 | 0.7 | 26 | 0 | 23 | 0 | 13.7 | -1.1 |
| CKS | 33 | 0 | 15 | 1.9 | 0.8 | 34 | 0 | 12 | 0 | 6.4 | 0.9 |
| CLX | 29 | 0 | 3 | 2.2 | -0.8 | 29 | 0 | 0 | 0 | 5.1 | -0.6 |
| COA | 43 | 2 | 49 | 0.7 | -0.2 | 43 | 0 | 47 | 0 | 3.8 | -0.1 |
| CRL | 47 | 6 | 6 | 1.1 | 0.7 | 42 | 0 | 2 | 0 | 5.0 | 0.1 |
| DAL | 184 | 0 | 41 | 1.4 | -0.5 | 181 | 0 | 43 | 0 | 7.2 | 0.3 |
| DLH | 353 | 1 | 12 | 1.3 | -0.3 | 349 | 0 | 14 | 0 | 8.5 | 0.4 |
| EIA | 70 | 0 | 100 | 1.8 | 0.5 | 69 | 0 | 100 | 0 | 22.6 | 6.4 |
| FDX | 726 | 0 | 29 | 1.4 | 0.1 | 731 | 0 | 31 | 0 | 9.2 | 0.5 |
| FIN | 31 | 0 | 10 | 1.7 | -0.2 | 30 | 3 | 13 | 0 | 9.3 | 0.1 |
| GAF | 46 | 0 | 0 | 0.9 | 0.1 | 41 | 0 | 5 | 0 | 9.1 | 0.7 |
| GCO | 307 | 1 | 12 | 1.2 | 0.0 | 312 | 0 | 31 | 0 | 15.1 | 2.3 |
| GTI | 67 | 0 | 7 | 1.8 | -0.6 | 68 | 0 | 6 | 0 | 4.4 | 0.3 |
| HAL | 295 | 1 | 40 | 1.5 | -0.2 | 294 | 0 | 39 | 0 | 6.0 | 2.1 |
| IBE | 49 | 2 | 10 | 2.1 | 0.5 | 41 | 0 | 10 | 0 | 6.9 | 0.4 |
| ICE | 37 | 0 | 11 | 1.7 | -1.0 | 35 | 0 | 14 | 0 | 7.1 | 1.5 |
| JAA | 46 | 2 | 7 | 1.3 | 0.3 | 46 | 0 | 7 | 0 | 7.7 | 2.5 |
| JAL | 74 | 0 | 5 | 1.3 | 0.4 | 74 | 0 | 8 | 0 | 8.2 | 1.6 |
| JAZ | 90 | 0 | 6 | 1.4 | 0.5 | 90 | 1 | 8 | 0 | 8.1 | 0.5 |
| KAL | 58 | 2 | 14 | 1.4 | -0.5 | 55 | 0 | 11 | 0 | 5.1 | 0.5 |
| KIW | 43 | 0 | 35 | 2.1 | 1.3 | 46 | 0 | 33 | 0 | 6.8 | -0.5 |
| KLM | 66 | 0 | 3 | 1.4 | 0.0 | 58 | 0 | 5 | 0 | 6.0 | 0.6 |
| LAN | 41 | 2 | 10 | 1.1 | 0.2 | 42 | 0 | 10 | 0 | 5.0 | 0.0 |
| LDI | 22 | 0 | 0 | 1.7 | -1.4 | 20 | 0 | 0 | 0 | 6.4 | 1.3 |
| MPH | 91 | 0 | 1 | 1.5 | 0.0 | 89 | 0 | 1 | 0 | 7.7 | 0.0 |
| MYT | 26 | 4 | 8 | 3.5 | 2.0 | 25 | 0 | 4 | 0 | 6.6 | 1.8 |
| NCA | 125 | 0 | 1 | 1.6 | -0.4 | 95 | 0 | 0 | 0 | 5.8 | 0.2 |
| NWA | 387 | 2 | 22 | 1.9 | 0.0 | 380 | 0 | 20 | 0 | 7.0 | -0.4 |
| NZL | 16567 | 0 | 54 | 1.3 | 0.5 | 16567 | 0 | 54 | 0 | 4.3 | -0.1 |
| PAC | 53 | 0 | 11 | 1.9 | -0.2 | 55 | 0 | 11 | 0 | 8.9 | -0.3 |
| QFA | 129 | 0 | 42 | 1.4 | 0.2 | 129 | 0 | 42 | 0 | 5.7 | 0.3 |
| RCH | 239 | 1 | 24 | 2.6 | -0.7 | 209 | 0 | 100 | 0 | 11.6 | 0.9 |
| RRR | 40 | 0 | 13 | 3.4 | 1.7 | 38 | 3 | 21 | 0 | 13.1 | 1.2 |
| SAA | 64 | 3 | 3 | 1.2 | -1.0 | 64 | 0 | 2 | 0 | 7.9 | -1.0 |
| SIA | 44 | 0 | 0 | 1.1 | 0.3 | 46 | 0 | 2 | 0 | 3.9 | 0.8 |
| SLR | 27 | 4 | 7 | 1.4 | -0.2 | 26 | 0 | 8 | 0 | 9.7 | -0.2 |
| UAL | 339869 | 0 | 92 | 1.2 | -0.1 | 339433 | 0 | 92 | 0 | 4.4 | 0.3 |
| UPS | 318 | 0 | 42 | 1.4 | -0.2 | 308 | 0 | 43 | 0 | 7.7 | 0.2 |
| VVP | 43 | 5 | 63 | 4.1 | 1.4 | 43 | 0 | 67 | 0 | 21.1 | -0.6 |
| WOA | 136 | 0 | 6 | 1.5 | 0.1 | 135 | 0 | 7 | 0 | 8.3 | 1.4 |
| AR | 756 | 0 | 100 | 1.9 | 1.5 | 747 | 0 | 45 | 0 | 4.8 | 0.2 |
| AU | 31531 | 0 | 53 | 1.1 | 0.3 | 31603 | 0 | 53 | 0 | 4.0 | 0.0 |

|  |  | TEMPERATURE |  |  |  |  |  | WIND |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| EU | 836675 | 0 | 72 | 1.0 | 0.2 | 833913 | 0 | 72 | 0 | 3.7 | 0.0 |
| KL | 2763 | 0 | 59 | 1.5 | 0.4 | 2768 | 0 | 59 | 0 | 4.5 | 0.3 |
| LH | 523 | 0 | 59 | 1.4 | 0.8 | 519 | 0 | 58 | 0 | 3.6 | 0.4 |
| MK | 2746 | 0 | 89 | 1.7 | 1.1 | 2736 | 0 | 53 | 0 | 4.5 | 0.4 |
| SA | 1097 | 0 | 48 | 1.8 | 1.4 | 1096 | 0 | 48 | 0 | 4.8 | 0.7 |
| SV | 1011 | 0 | 56 | 2.8 | 2.4 | 997 | 0 | 55 | 0 | 4.6 | 1.3 |
| N | 39 | 3 | 28 | 1.9 | 0.3 | 40 | 0 | 30 | 0 | 5.9 | 1.2 |
| US ACARS | 1637946 | 0 | 78 | 1.3 | 0.4 | 1632400 | 0 | 77 | 0 | 4.5 | 0.3 |

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 43619

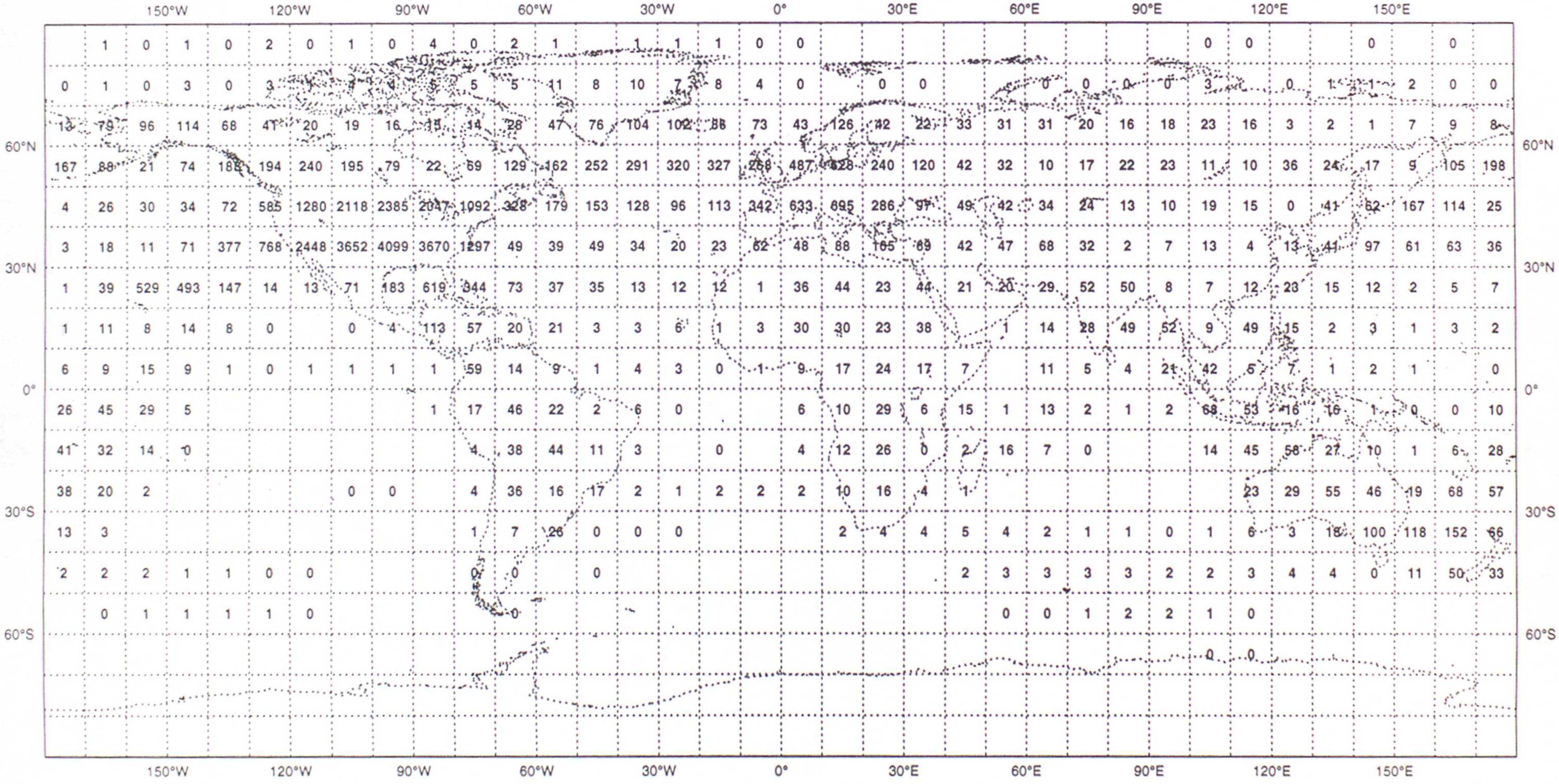

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 0 1 0 2 0 1 0 4 0 2 1 1 1 1 0 0 0 0 0 0
0 1 0 3 0 3 1 4 4 5 5 5 11 8 10 7 8 4 0 0 0 0 0 0 0 3 0 1 1 2 0 0
13 79 96 114 68 41 20 19 16 15 14 28 47 76 104 102 88 73 43 126 42 22 33 31 31 20 16 18 23 16 3 2 1 7 9 8
167 88 21 74 188 194 240 195 79 22 69 129 162 252 291 320 327 268 487 628 240 120 42 32 10 17 22 23 11 10 36 24 17 9 105 198
4 26 30 34 72 585 1280 2118 2385 2047 1092 328 179 153 128 96 113 342 633 695 286 97 49 42 34 24 13 10 19 15 0 41 62 167 114 25
3 18 11 71 377 768 2448 3652 4099 3670 1297 49 39 49 34 20 23 62 48 88 165 69 42 47 68 32 2 7 13 4 13 41 97 61 63 36
1 39 529 493 147 14 13 71 183 619 344 73 37 35 13 12 12 1 36 44 23 44 21 20 29 52 50 8 7 12 23 15 12 2 5 7
1 11 8 14 8 0 0 4 113 57 20 21 3 3 6 1 3 30 30 23 38 1 14 28 49 52 9 49 15 2 3 1 3 2
6 9 15 9 1 0 1 1 1 1 59 14 9 1 4 3 0 1 9 17 24 17 7 11 5 4 21 42 5 7 1 2 1 0
26 45 29 5 1 17 46 22 2 6 0 6 10 29 6 15 1 13 2 1 2 68 53 16 16 1 0 0 10
41 32 14 0 4 38 44 11 3 0 4 12 26 0 2 16 7 0 14 45 58 27 10 1 6 28
38 20 2 0 0 4 36 16 17 2 1 2 2 2 10 16 4 1 23 29 55 46 19 68 57
13 3 1 7 26 0 0 0 2 4 4 5 4 2 1 1 0 1 6 3 18 100 118 152 66
2 2 2 1 1 0 0 0 0 0 2 3 3 3 3 2 2 3 4 4 0 11 50 33
0 1 1 1 1 0 0 0 0 1 2 2 1 0
0 0

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 92518

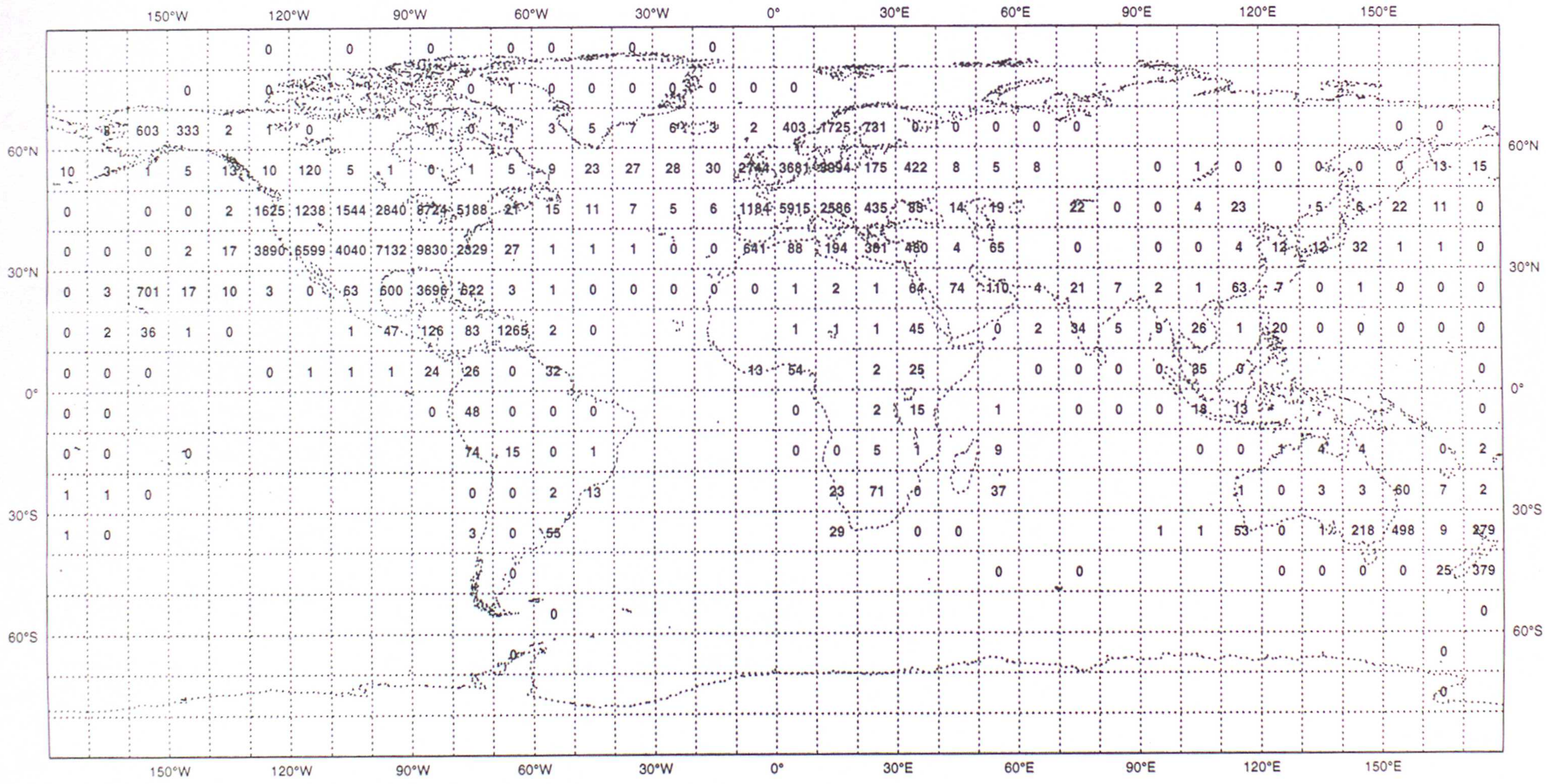

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

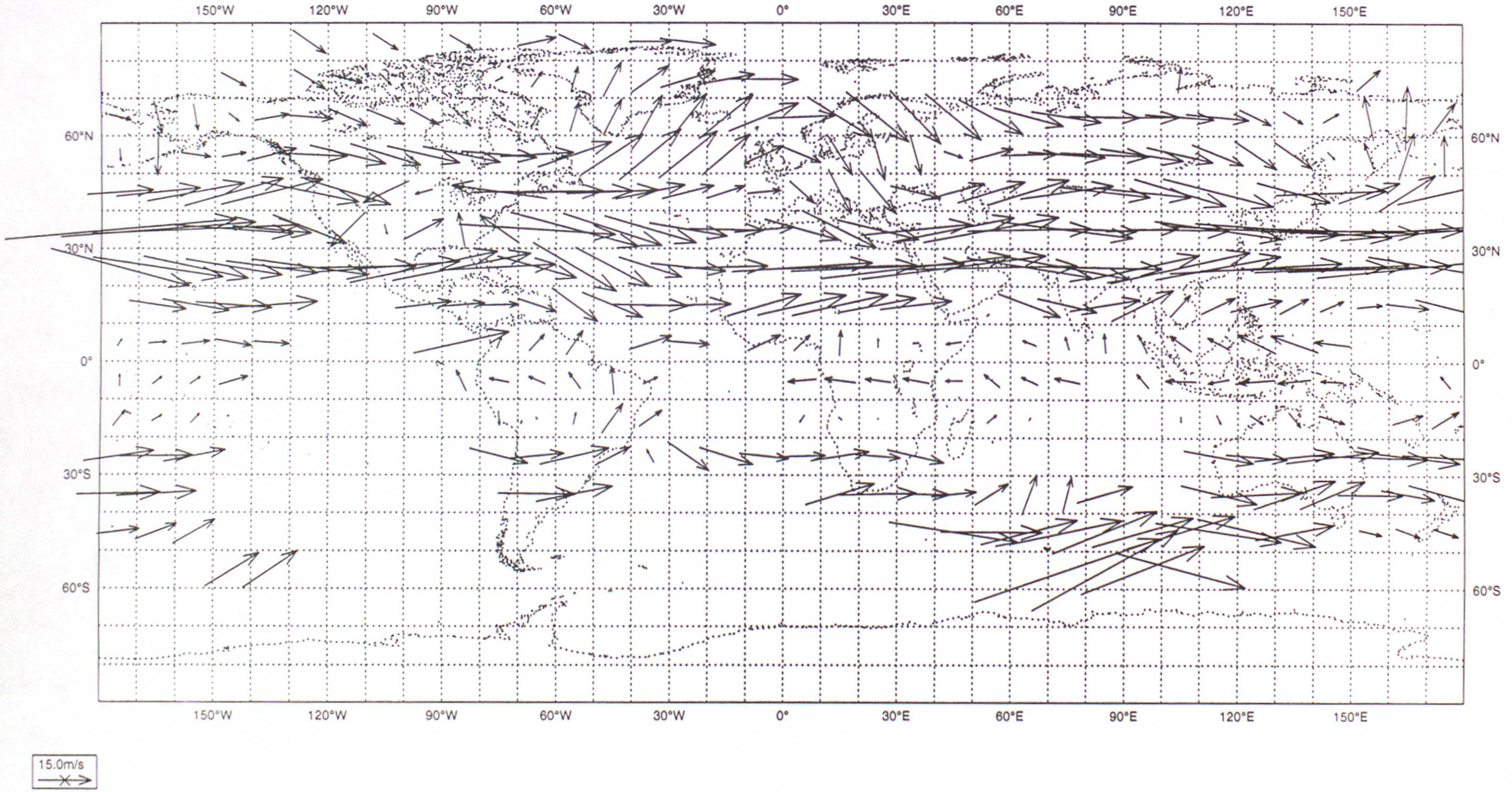

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

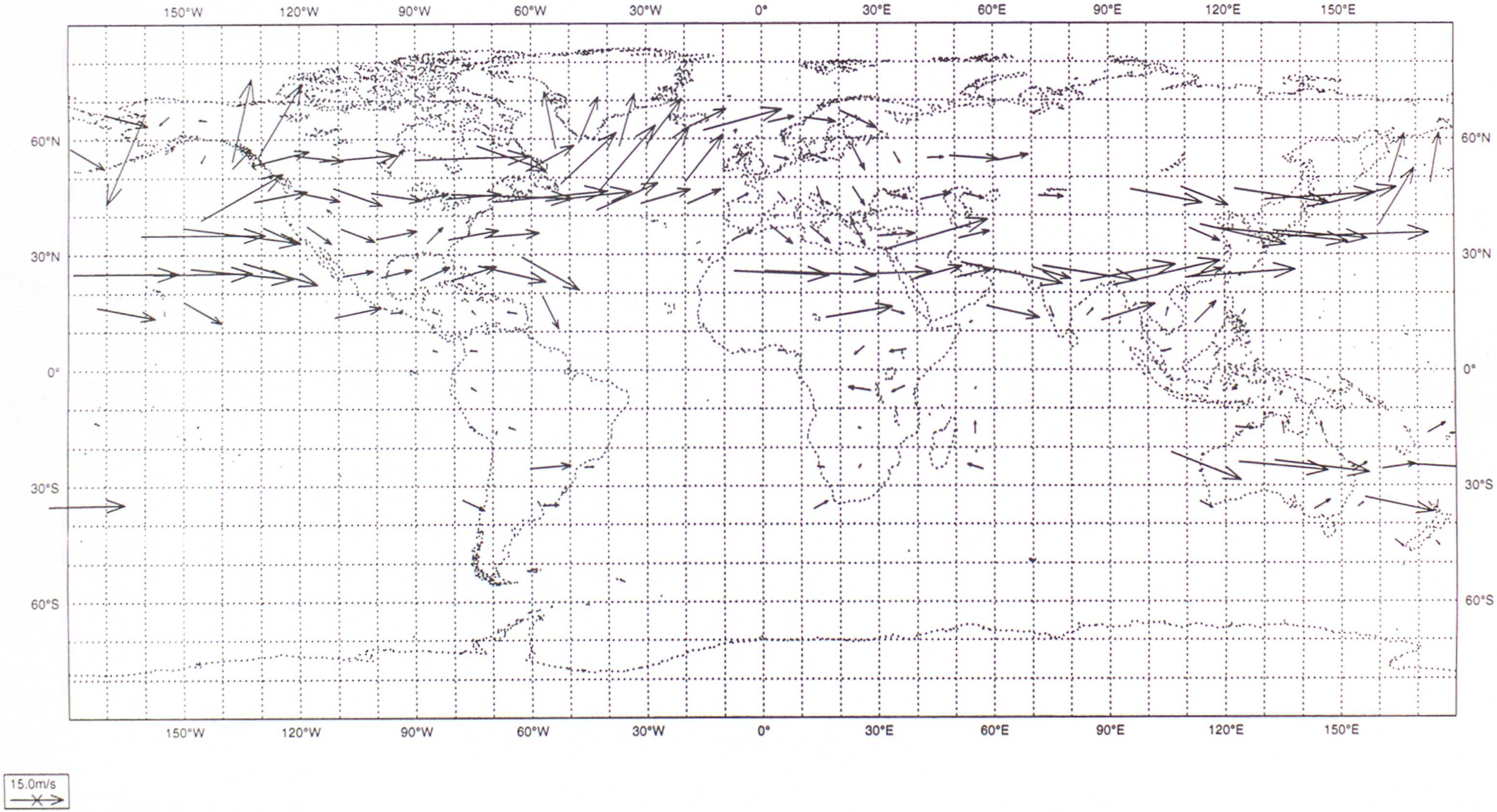

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

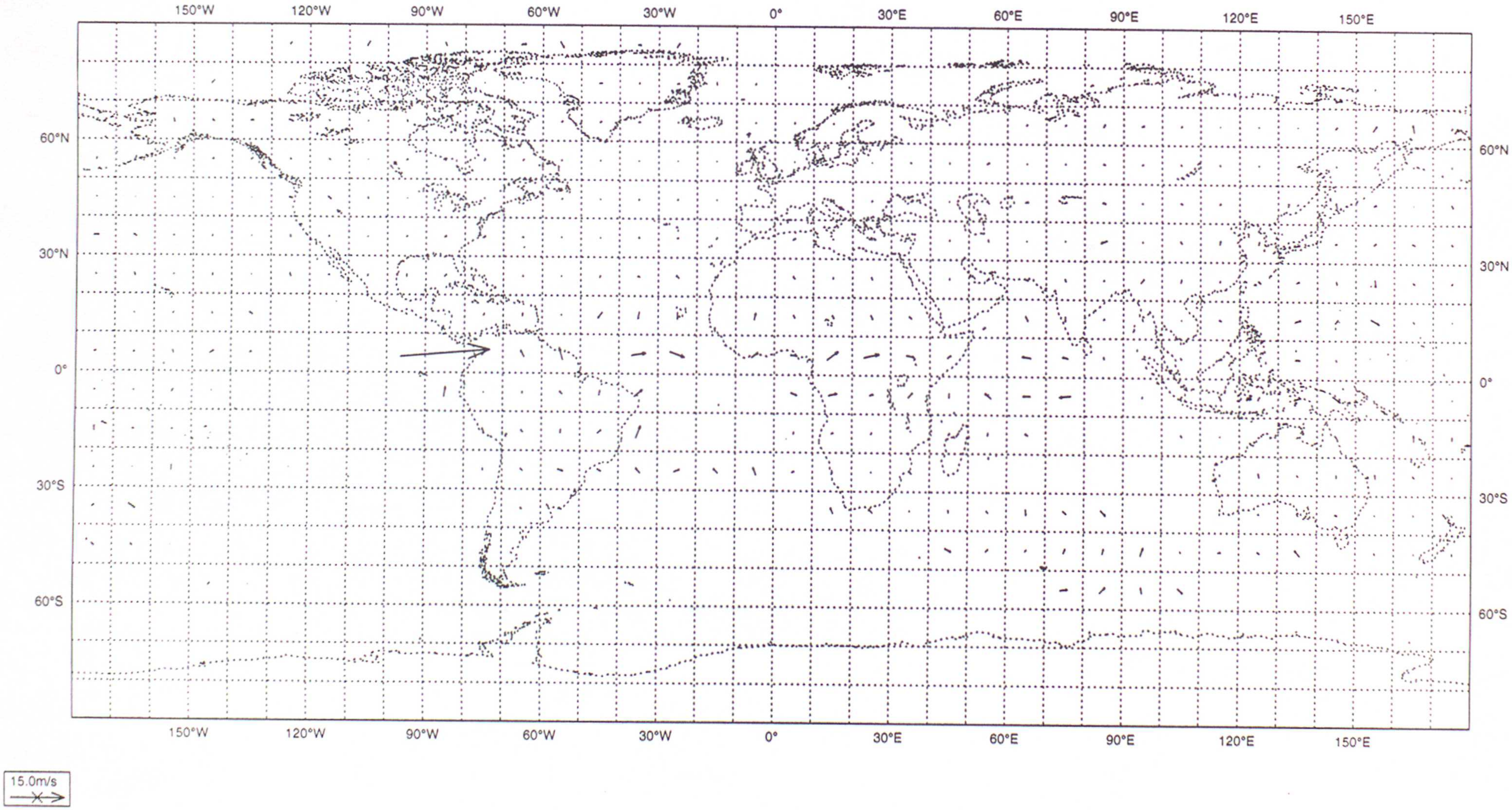

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

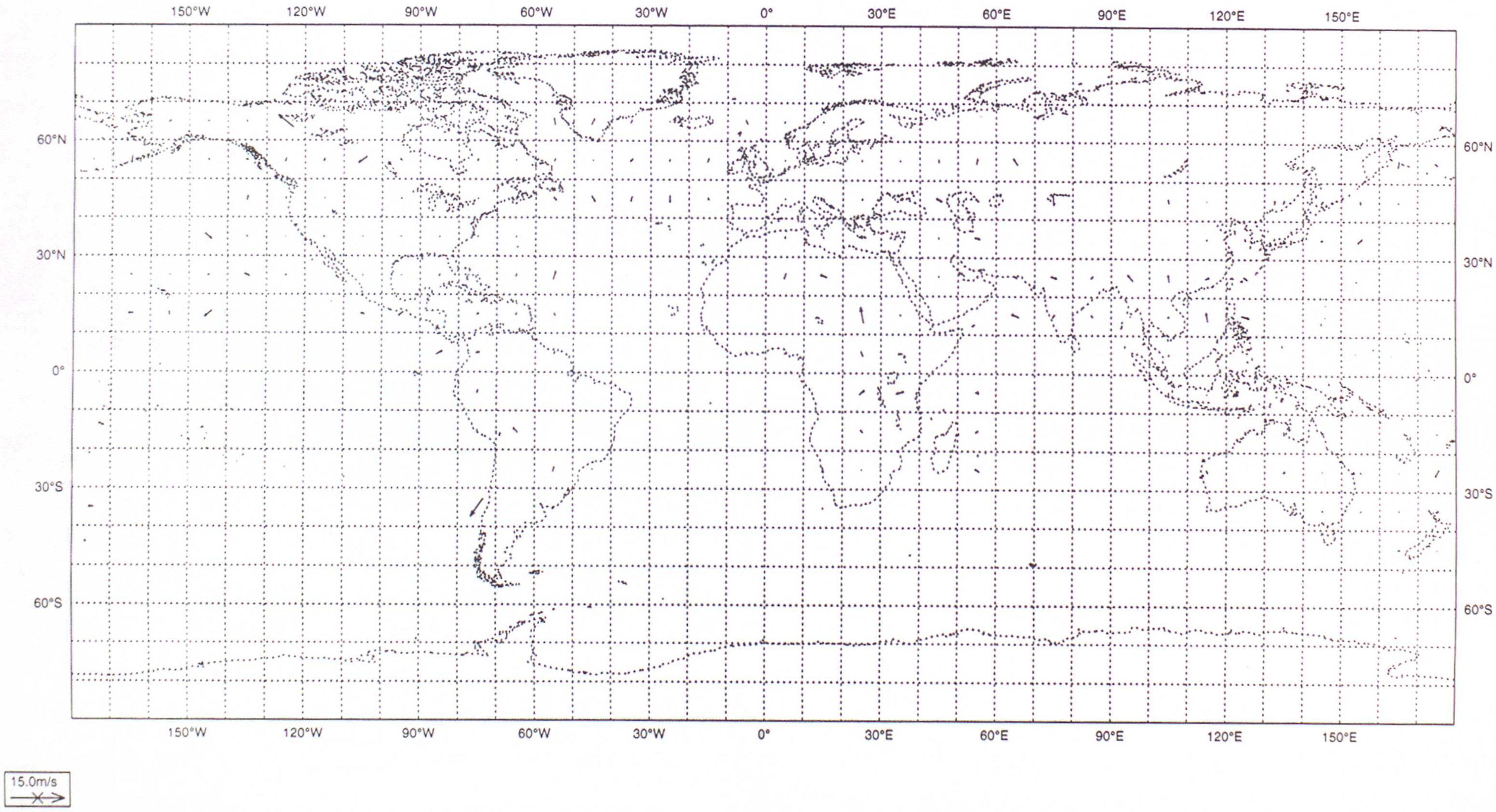

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

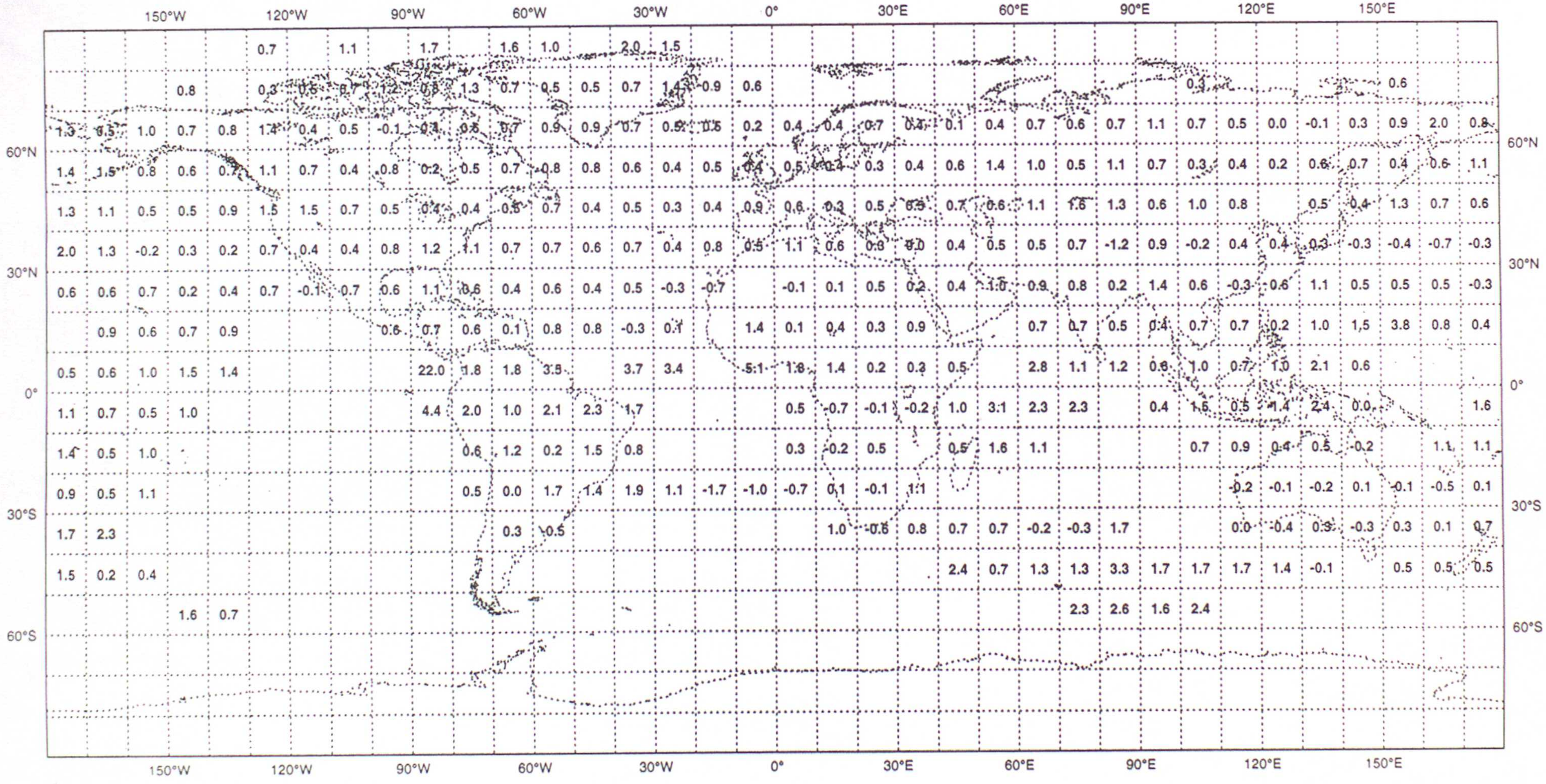

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

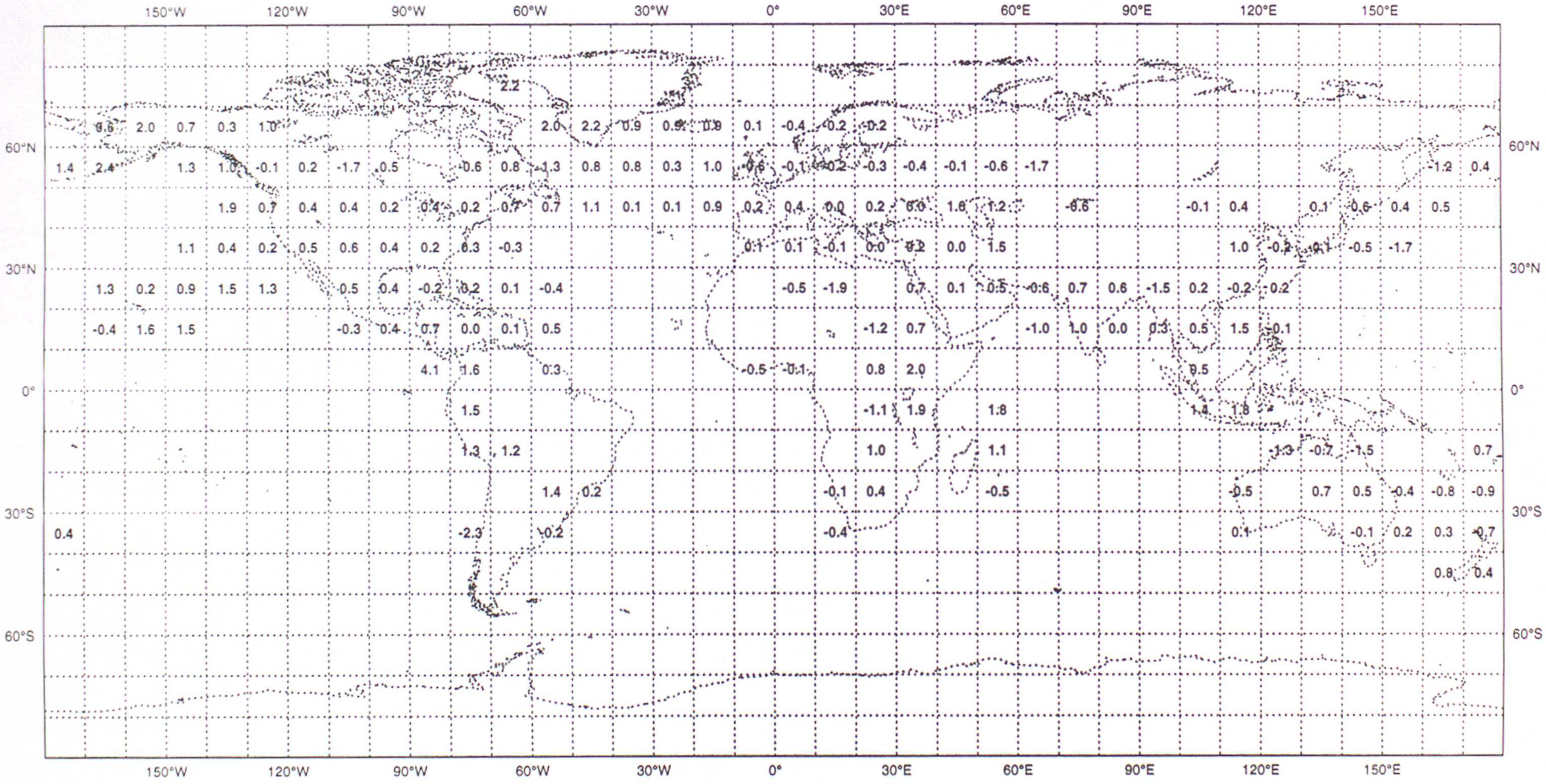

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2.2
0.6 2.0 0.7 0.3 1.0 2.0 2.2 0.9 0.9 0.9 0.1 -0.4 -0.2 -0.2
1.4 2.4 1.3 1.0 -0.1 0.2 -1.7 0.5 -0.6 0.8 -1.3 0.8 0.8 0.3 1.0 -0.6 -0.1 -0.2 -0.3 -0.4 -0.1 -0.6 -1.7 -1.2 0.4
1.9 0.7 0.4 0.4 0.2 0.4 0.2 -0.7 0.7 1.1 0.1 0.1 0.9 0.2 0.4 0.0 0.2 0.0 1.6 1.2 -0.6 -0.1 0.4 0.1 -0.6 0.4 0.5
1.1 0.4 0.2 0.5 0.6 0.4 0.2 0.3 -0.3 0.1 0.1 -0.1 0.0 0.2 0.0 1.5 1.0 -0.2 -0.1 -0.5 -1.7
1.3 0.2 0.9 1.5 1.3 -0.5 0.4 -0.2 0.2 0.1 -0.4 -0.5 -1.9 0.7 0.1 0.5 -0.6 0.7 0.6 -1.5 0.2 -0.2 -0.2
-0.4 1.6 1.5 -0.3 0.4 0.7 0.0 0.1 0.5 -1.2 0.7 -1.0 1.0 0.0 0.3 0.5 1.5 -0.1
4.1 1.6 0.3 -0.5 -0.1 0.8 2.0 0.5
1.5 -1.1 1.9 1.8 1.4 1.8
1.3 1.2 1.0 1.1 -1.3 -0.7 -1.5 0.7
1.4 0.2 -0.1 0.4 -0.5 -0.5 0.7 0.5 -0.4 -0.8 -0.9
0.4 -2.3 -0.2 -0.4 0.1 -0.1 0.2 0.3 -0.7
0.8 0.4

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

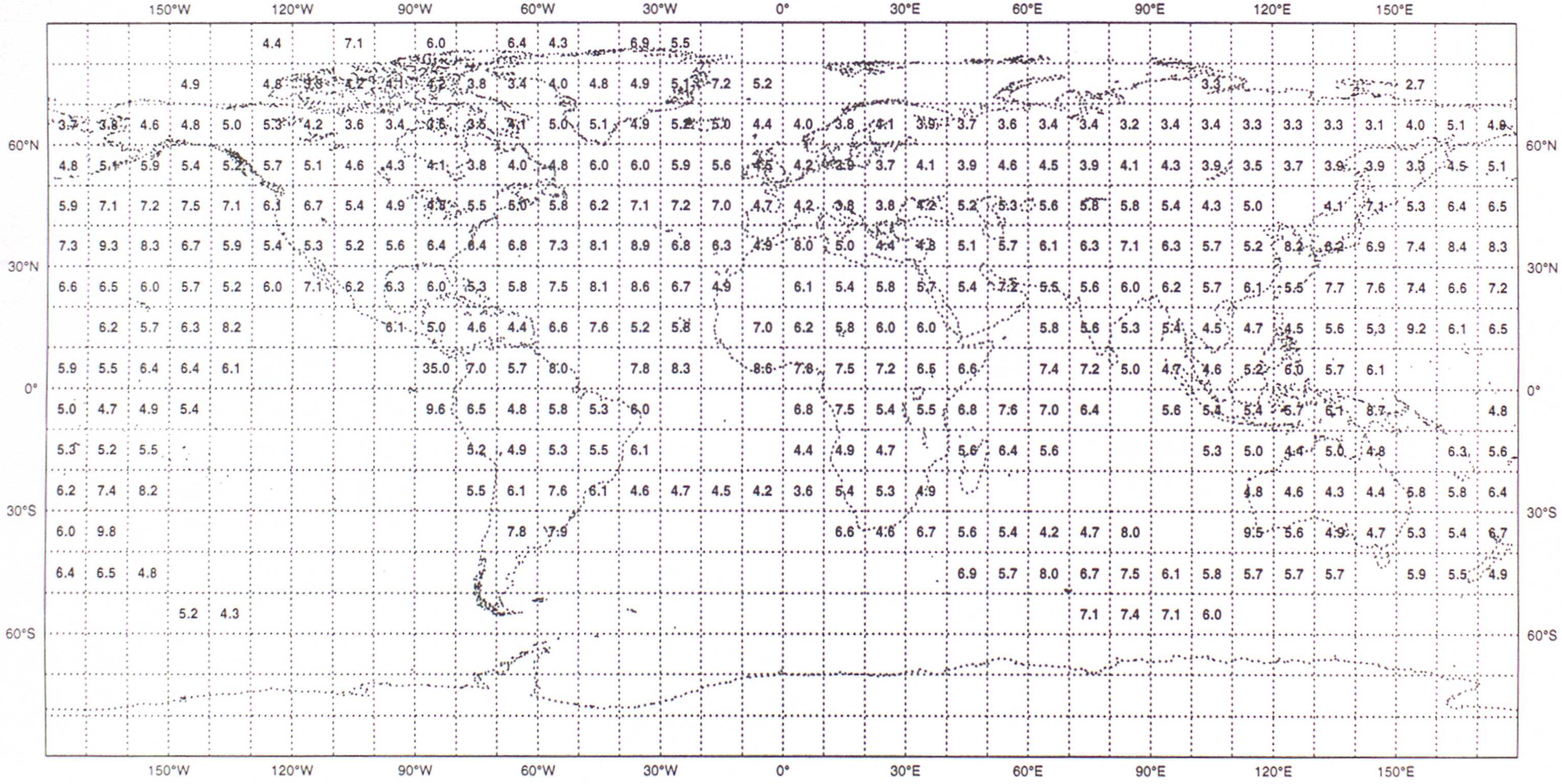
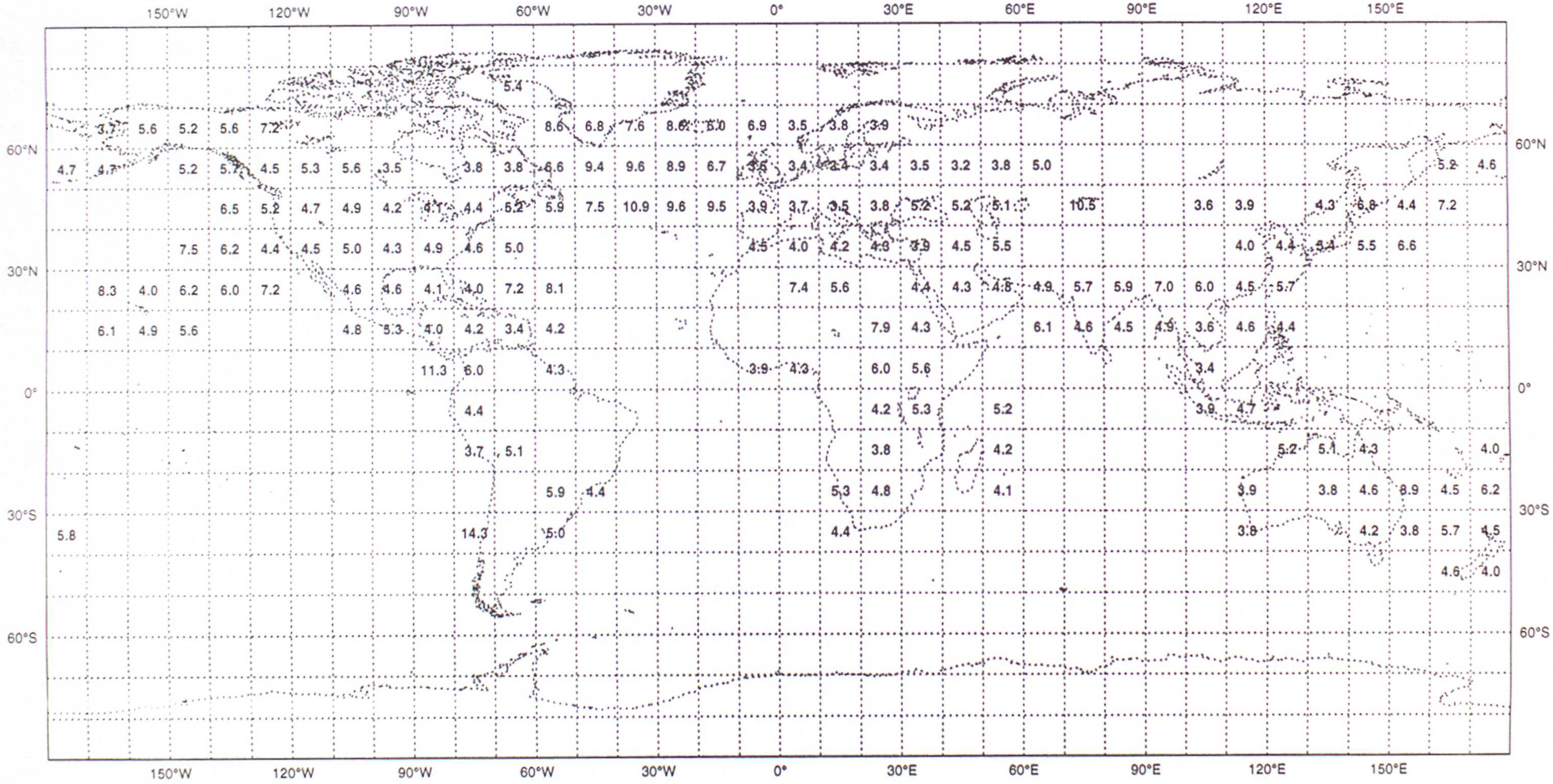

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.4 7.1 6.0 6.4 4.3 6.9 5.5
4.9 4.8 3.8 4.2 4.1 4.2 3.8 3.4 4.0 4.8 4.9 5.1 7.2 5.2 3.3 2.7
3.7 3.8 4.6 4.8 5.0 5.3 4.2 3.6 3.4 3.6 3.5 4.1 5.0 5.1 4.9 5.2 5.0 4.4 4.0 3.8 4.1 3.9 3.7 3.6 3.4 3.4 3.2 3.4 3.4 3.3 3.3 3.3 3.1 4.0 5.1 4.9
4.8 5.1 5.9 5.4 5.2 5.7 5.1 4.6 4.3 4.1 3.8 4.0 4.8 6.0 6.0 5.9 5.6 4.5 4.2 2.9 3.7 4.1 3.9 4.6 4.5 3.9 4.1 4.3 3.9 3.5 3.7 3.9 3.9 3.3 4.5 5.1
5.9 7.1 7.2 7.5 7.1 6.3 6.7 5.4 4.9 4.8 5.5 5.0 5.8 6.2 7.1 7.2 7.0 4.7 4.2 3.8 3.8 4.2 5.2 5.3 5.6 5.8 5.8 5.4 4.3 5.0 4.1 7.1 5.3 6.4 6.5
7.3 9.3 8.3 6.7 5.9 5.4 5.3 5.2 5.6 6.4 6.4 6.8 7.3 8.1 8.9 6.8 6.3 4.9 8.0 5.0 4.4 4.8 5.1 5.7 6.1 6.3 7.1 6.3 5.7 5.2 8.2 6.2 6.9 7.4 8.4 8.3
6.6 6.5 6.0 5.7 5.2 6.0 7.1 6.2 6.3 6.0 5.3 5.8 7.5 8.1 8.6 6.7 4.9 6.1 5.4 5.8 5.7 5.4 7.2 5.5 5.6 6.0 6.2 5.7 6.1 5.5 7.7 7.6 7.4 6.6 7.2
6.2 5.7 6.3 8.2 6.1 5.0 4.6 4.4 6.6 7.6 5.2 5.8 7.0 6.2 5.8 6.0 6.0 5.8 5.6 5.3 5.4 4.5 4.7 4.5 5.6 5.3 9.2 6.1 6.5
5.9 5.5 6.4 6.4 6.1 35.0 7.0 5.7 8.0 7.8 8.3 8.6 7.8 7.5 7.2 6.5 6.6 7.4 7.2 5.0 4.7 4.6 5.2 6.0 5.7 6.1
5.0 4.7 4.9 5.4 9.6 6.5 4.8 5.8 5.3 6.0 6.8 7.5 5.4 5.5 6.8 7.6 7.0 6.4 5.6 5.4 5.4 5.7 6.1 8.7 4.8
5.3 5.2 5.5 5.2 4.9 5.3 5.5 6.1 4.4 4.9 4.7 5.6 6.4 5.6 5.3 5.0 4.4 5.0 4.8 6.3 5.6
6.2 7.4 8.2 5.5 6.1 7.6 6.1 4.6 4.7 4.5 4.2 3.6 5.4 5.3 4.9 4.8 4.6 4.3 4.4 5.8 5.8 6.4
6.0 9.8 7.8 7.9 6.6 4.6 6.7 5.6 5.4 4.2 4.7 8.0 9.5 5.6 4.9 4.7 5.3 5.4 6.7
6.4 6.5 4.8 6.9 5.7 8.0 6.7 7.5 6.1 5.8 5.7 5.7 5.7 5.9 5.5 4.9
5.2 4.3 7.1 7.4 7.1 6.0

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). MARCH 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.4
3.7 5.6 5.2 5.6 7.2 8.6 6.8 7.6 8.6 5.0 6.9 3.5 3.8 3.9
4.7 4.7 5.2 5.7 4.5 5.3 5.6 3.5 3.8 3.8 6.6 9.4 9.6 8.9 6.7 3.5 3.4 2.4 3.4 3.5 3.2 3.8 5.0 5.2 4.6
6.5 5.2 4.7 4.9 4.2 4.1 4.4 5.2 5.9 7.5 10.9 9.6 9.5 3.9 3.7 3.5 3.8 5.2 5.2 5.1 10.5 3.6 3.9 4.3 6.8 4.4 7.2
7.5 6.2 4.4 4.5 5.0 4.3 4.9 4.6 5.0 4.5 4.0 4.2 4.8 3.9 4.5 5.5 4.0 4.4 5.4 5.5 6.6
8.3 4.0 6.2 6.0 7.2 4.6 4.6 4.1 4.0 7.2 8.1 7.4 5.6 4.4 4.3 4.8 4.9 5.7 5.9 7.0 6.0 4.5 5.7
6.1 4.9 5.6 4.8 5.3 4.0 4.2 3.4 4.2 7.9 4.3 6.1 4.6 4.5 4.9 3.6 4.6 4.4
11.3 6.0 4.3 3.9 4.3 6.0 5.6 3.4
4.4 4.2 5.3 5.2 3.9 4.7
3.7 5.1 3.8 4.2 5.2 5.1 4.3 4.0
5.9 4.4 5.3 4.8 4.1 3.9 3.8 4.6 8.9 4.5 6.2
5.8 14.3 5.0 4.4 3.8 4.2 3.8 5.7 4.5
4.6 4.0

# TABLE 5

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

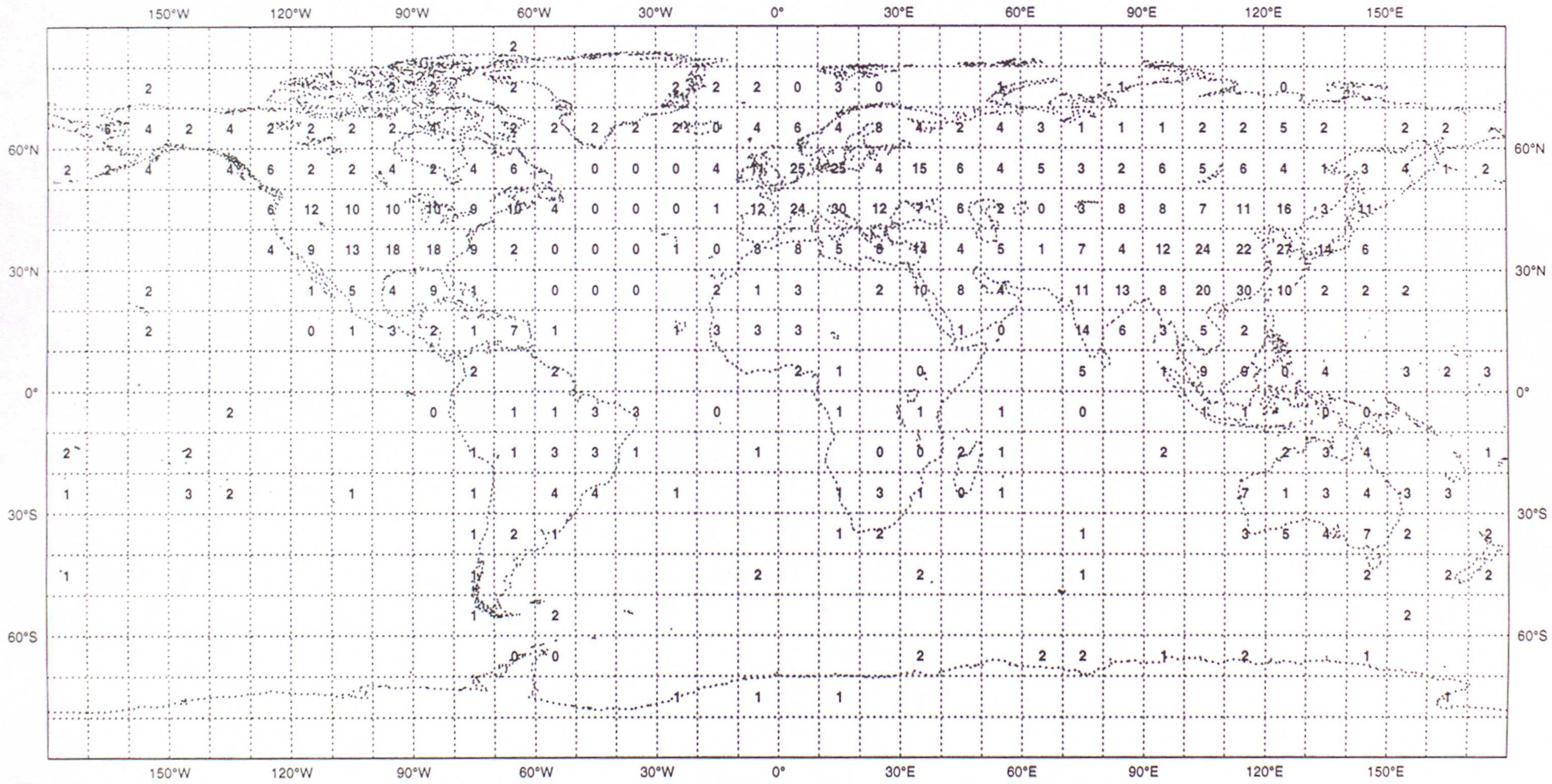
**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 1000.0 - 30.0 hPa |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT IN metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :% REJ | :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| | :NUM LEVELS | :Number of levels satisfying selection criteria. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.1 | |
| **SELECTION CRITERIA** | : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS. | |

**ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS**

| WMO IDENT | OBS TIME | ELM | LEV | LAT/LONG | NUM OBS | NUM GROSS | SD | BIAS | RMS | NUM LEVELS |
|---|---|---|---|---|---|---|---|---|---|---|
| 20674 | 12 | Z | 50 | 73/ 80 | 16 | 0 | 117.1 | 240.9 | 267.9 | 8 |
| 23472 | 00 | Z | 1000 | 66/ 88 | 16 | 8 | 32.2 | -23.8 | 40.1 | 8 |
| 23472 | 12 | Z | 1000 | 66/ 88 | 17 | 7 | 37.7 | -30.5 | 48.5 | 8 |
| 28722 | 00 | Z | 1000 | 55/ 56 | 30 | 0 | 30.7 | -29.9 | 42.9 | 4 |
| 32098 | 00 | Z | 1000 | 49/ 143 | 27 | 2 | 36.0 | -29.9 | 46.7 | 4 |
| 42101 | 00 | Z | 200 | 30/ 76 | 29 | 0 | 73.8 | -31.0 | 80.0 | 4 |
| 42101 | 12 | Z | 200 | 30/ 76 | 23 | 0 | 88.0 | -13.2 | 89.0 | 5 |
| 42339 | 12 | Z | 200 | 26/ 73 | 19 | 0 | 98.4 | -18.5 | 100.1 | 6 |
| 42361 | 00 | Z | 1000 | 26/ 78 | 5 | 22 | 3.6 | -94.0 | 94.1 | 4 |
| 42361 | 12 | Z | 1000 | 26/ 78 | 1 | 26 | 0.0 | -100.0 | 100.0 | 8 |
| 42369 | 00 | Z | 1000 | 27/ 81 | 29 | 0 | 17.0 | -40.6 | 44.0 | 4 |
| 42379 | 00 | Z | 200 | 27/ 83 | 17 | 0 | 47.5 | -69.6 | 84.3 | 4 |
| 42410 | 00 | Z | 1000 | 26/ 92 | 7 | 19 | 6.0 | -93.3 | 93.5 | 4 |
| 42410 | 12 | Z | 1000 | 26/ 92 | 1 | 25 | 0.0 | -93.0 | 93.0 | 4 |
| 42492 | 00 | Z | 250 | 26/ 85 | 24 | 0 | 79.6 | 15.4 | 81.1 | 5 |
| 42647 | 00 | Z | 200 | 23/ 73 | 16 | 0 | 62.4 | -80.3 | 101.6 | 4 |
| 42647 | 12 | Z | 150 | 23/ 73 | 20 | 0 | 82.9 | 77.3 | 113.4 | 6 |
| 42667 | 00 | Z | 200 | 23/ 77 | 24 | 0 | 62.3 | -65.4 | 90.3 | 4 |
| 42667 | 12 | Z | 70 | 23/ 77 | 10 | 0 | 113.4 | 93.3 | 146.8 | 4 |
| 42701 | 12 | Z | 50 | 23/ 85 | 10 | 1 | 130.4 | 95.2 | 161.5 | 7 |
| 42724 | 12 | Z | 200 | 24/ 91 | 25 | 0 | 45.9 | -75.5 | 88.4 | 4 |
| 42867 | 00 | Z | 70 | 21/ 79 | 10 | 1 | 121.6 | 82.7 | 147.0 | 9 |
| 42867 | 12 | Z | 100 | 21/ 79 | 13 | 0 | 144.7 | 14.1 | 145.4 | 8 |
| 43003 | 00 | Z | 1000 | 19/ 73 | 29 | 0 | 9.2 | -69.2 | 69.8 | 7 |
| 43003 | 12 | Z | 1000 | 19/ 73 | 31 | 0 | 9.7 | -79.1 | 79.7 | 9 |
| 43014 | 00 | Z | 200 | 20/ 75 | 20 | 0 | 107.1 | -66.9 | 126.3 | 6 |
| 43014 | 12 | Z | 200 | 20/ 75 | 17 | 0 | 111.4 | -7.4 | 111.6 | 5 |
| 43128 | 00 | Z | 100 | 17/ 78 | 25 | 0 | 85.4 | -142.6 | 166.2 | 4 |
| 43192 | 00 | Z | 1000 | 15/ 74 | 1 | 25 | 0.0 | -100.0 | 100.0 | 7 |
| 43279 | 00 | Z | 150 | 13/ 80 | 12 | 0 | 97.6 | -77.3 | 124.5 | 4 |
| 43285 | 00 | Z | 100 | 13/ 75 | 18 | 0 | 87.8 | -97.6 | 131.3 | 4 |
| 43285 | 12 | Z | 30 | 13/ 75 | 15 | 0 | 126.9 | 159.7 | 204.0 | 8 |
| 43295 | 00 | Z | 50 | 13/ 78 | 15 | 0 | 100.1 | 144.4 | 175.7 | 6 |
| 43295 | 12 | Z | 50 | 13/ 78 | 9 | 1 | 66.7 | 256.7 | 265.2 | 4 |
| 43311 | 00 | Z | 150 | 11/ 73 | 14 | 1 | 53.0 | -143.6 | 153.0 | 5 |
| 43346 | 00 | Z | 30 | 11/ 80 | 14 | 1 | 121.8 | 259.3 | 286.5 | 5 |
| 43353 | 00 | Z | 1000 | 10/ 76 | 22 | 1 | 8.1 | -83.4 | 83.8 | 5 |
| 43369 | 00 | Z | 250 | 8/ 73 | 17 | 2 | 80.7 | 86.4 | 118.2 | 7 |
| 43369 | 12 | Z | 250 | 8/ 73 | 20 | 1 | 84.9 | 94.0 | 126.6 | 7 |
| 43371 | 00 | Z | 150 | 8/ 77 | 21 | 1 | 66.2 | -148.8 | 162.9 | 7 |
| 43371 | 12 | Z | 30 | 8/ 77 | 12 | 0 | 75.9 | 218.3 | 231.1 | 6 |
| 43466 | 12 | Z | 200 | 7/ 80 | 4 | 0 | 75.0 | 104.5 | 128.7 | 4 |
| 78866 | 12 | Z | 30 | 18/ -63 | 17 | 0 | 54.7 | 181.9 | 190.0 | 6 |
| 78970 | 12 | Z | 70 | 11/ -61 | 12 | 11 | 90.6 | 252.2 | 268.0 | 11 |
| 82193 | 12 | Z | 50 | -1/ -48 | 3 | 0 | 174.7 | 33.7 | 177.9 | 7 |
| 83746 | 00 | Z | 1000 | -23/ -43 | 8 | 14 | 6.7 | -92.0 | 92.2 | 6 |
| 83971 | 00 | Z | 1000 | -30/ -51 | 20 | 0 | 23.8 | -22.6 | 32.9 | 5 |
| 96163 | 00 | Z | 1000 | -1/ 100 | 3 | 8 | 6.4 | -90.0 | 90.2 | 5 |
| 97180 | 00 | Z | 200 | -5/ 120 | 10 | 0 | 73.9 | -66.5 | 99.4 | 5 |

Figure 8. TEMP 500 hPa geopotential mean daily count. MARCH 2003
All hours
Global average number of observations in 24 hours = 1163


150°W
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60°S

## TABLE 6

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

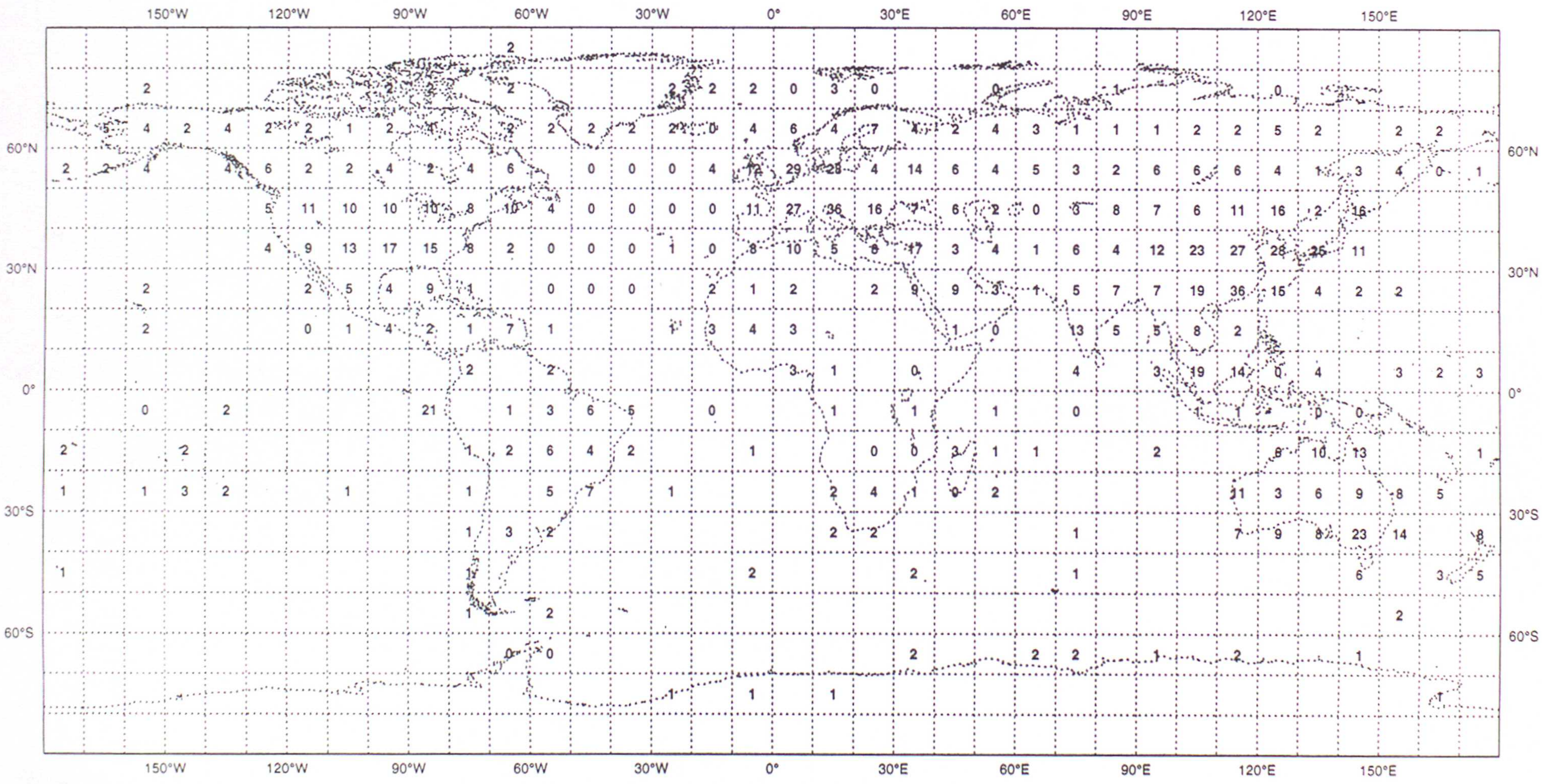
**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 1000.0 - 100.0 hPa |
| **Element monitored** | | :VECTOR WIND in m $s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :% REJ | :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors. |
| | :UBIAS,VBIAS | :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| | :NUM LEVELS | :Number of levels satisfying selection criteria. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.2 | |
| **SELECTION CRITERIA** | : ≥ 10 observations and ≥ 15 m $s^{-1}$ RMS vector wind. | |

**ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN**

| WMO | OBS | | | | NUM | NUM | % | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT | TIME | ELM | LEV | LAT/LONG | OBS | GROSS | REJ | UBIAS | VBIAS | RMS | LEVELS |
| PSPIU | 00 | V | 100 | -5/ -81 | 27 | 0 | 100 | -2.0 | -5.4 | 19.4 | 2 |
| PSPIU | 12 | V | 100 | -5/ -81 | 26 | 0 | 100 | -3.1 | -2.9 | 23.8 | 2 |
| 40582 | 00 | V | 250 | 29/ 48 | 16 | 0 | 31 | -0.2 | 6.6 | 26.6 | 1 |
| 42182 | 00 | V | 100 | 29/ 77 | 12 | 0 | 100 | 3.5 | -7.7 | 18.4 | 3 |
| 42182 | 12 | V | 100 | 29/ 77 | 11 | 0 | 100 | 3.7 | -6.3 | 16.0 | 3 |
| 42361 | 00 | V | 300 | 26/ 78 | 11 | 0 | 100 | 10.9 | -1.2 | 16.1 | 1 |
| 42410 | 00 | V | 250 | 26/ 92 | 9 | 1 | 100 | 6.1 | 8.3 | 23.7 | 2 |
| 42410 | 12 | V | 400 | 26/ 92 | 17 | 0 | 100 | 10.4 | 9.0 | 17.8 | 1 |
| 42724 | 00 | V | 300 | 24/ 91 | 21 | 0 | 95 | -2.0 | 0.1 | 15.3 | 1 |
| 60656 | 12 | V | 200 | 28/ -8 | 27 | 0 | 100 | -12.0 | -5.0 | 17.4 | 1 |
| 62337 | 00 | V | 200 | 31/ 34 | 24 | 0 | 100 | -9.5 | 12.7 | 18.9 | 4 |
| 62337 | 12 | V | 200 | 31/ 34 | 26 | 0 | 100 | -8.2 | 16.0 | 22.7 | 4 |
| 62378 | 00 | V | 150 | 30/ 31 | 24 | 0 | 100 | -19.5 | -4.4 | 22.1 | 4 |
| 62378 | 12 | V | 200 | 30/ 31 | 25 | 0 | 100 | -19.9 | -0.4 | 28.3 | 4 |
| 62414 | 12 | V | 300 | 24/ 33 | 28 | 0 | 7 | -5.0 | -1.6 | 16.7 | 1 |
| 62423 | 00 | V | 150 | 27/ 28 | 27 | 1 | 100 | -12.4 | -0.7 | 23.8 | 5 |
| 62423 | 12 | V | 200 | 27/ 28 | 29 | 0 | 100 | -6.1 | 3.9 | 18.6 | 2 |
| 63741 | 00 | V | 100 | -1/ 37 | 30 | 0 | 30 | 11.9 | 0.2 | 16.4 | 1 |
| 64500 | 12 | V | 150 | 0/ 9 | 19 | 0 | 100 | 12.5 | -0.4 | 16.0 | 1 |
| 64910 | 12 | V | 150 | 4/ 10 | 23 | 0 | 100 | 11.1 | 0.4 | 15.5 | 1 |
| 68174 | 12 | V | 200 | -24/ 29 | 12 | 0 | 100 | -11.9 | 1.9 | 16.0 | 1 |
| 68263 | 12 | V | 250 | -26/ 28 | 13 | 0 | 15 | -8.2 | -0.3 | 16.6 | 1 |
| 71701 | 12 | V | 250 | 46/ -66 | 20 | 1 | 25 | -6.5 | -1.4 | 16.0 | 1 |
| 72376 | 12 | V | 300 | 37/-108 | 29 | 0 | 100 | 1.9 | -0.7 | 17.2 | 2 |
| 92044 | 00 | V | 100 | -2/ 147 | 5 | 0 | 100 | 20.7 | 3.7 | 25.2 | 1 |
| 97014 | 00 | V | 100 | 2/ 125 | 11 | 0 | 100 | 8.1 | -0.3 | 15.5 | 2 |

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. MARCH 2003
All hours
Global average number of observations in 24 hours = 1356


150°W
120°W
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60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

# TABLE 7

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 500.0 - 150.0 hPa |
| **Element monitored** | | :WIND DIRECTION in degrees |
| **Parameters monitored** | | |
| | :NUM OBS | :Average number of observations at all levels. |
| | :BIAS | :Mean difference of observations from background values from all levels. |
| | :MAX SPREAD | :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels |
| | :SD | :SD of difference of observations from background values at all levels. |

**SELECTION CRITERIA**

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

| WMO IDENT | OBS TIME | ELM | LAT/LONG | NUM OBS | BIAS | MAX SPREAD | SD |
|---|---|---|---|---|---|---|---|
| 10468 | 00 | DD | 52/ 12 | 27 | 14.1 | 2.4 | 8.8 |
| 10468 | 12 | DD | 52/ 12 | 27 | 13.4 | 6.6 | 11.9 |
| 34731 | 00 | DD | 47/ 40 | 22 | -12.1 | 3.5 | 11.5 |
| 34731 | 12 | DD | 47/ 40 | 19 | -10.5 | 4.0 | 13.8 |
| 42182 | 00 | DD | 29/ 77 | 25 | 10.7 | 2.2 | 8.4 |
| 42182 | 12 | DD | 29/ 77 | 23 | 14.0 | 2.5 | 10.4 |
| 42410 | 00 | DD | 26/ 92 | 12 | -15.4 | 7.7 | 18.2 |
| 62337 | 00 | DD | 31/ 34 | 27 | -18.3 | 2.0 | 5.8 |
| 62337 | 12 | DD | 31/ 34 | 28 | -18.5 | 1.8 | 4.8 |
| 82599 | 12 | DD | -6/ -35 | 14 | -12.3 | 9.4 | 24.2 |

# MONITORING OF SATELLITE WINDS

## MONITORING CENTRE: BRACKNELL

## MONTH: March 2003

**Monitoring procedures**

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT. |
| **Standard of comparison** | :Background field from UKMO global model. |
| **Selection Criteria** | :number of observations > 10. |
| **Data Extracted** | :Layer 701 - 1000 hPa<br>401 - 700 hPa<br>101 - 400 hPa<br>:Mean wind<br>:Mean observation minus background vector wind differences<br>:Mean observation minus background speed differences<br>:RMS of observation minus background vector differences |

Figure 10. SATOB 701 - 1000 hPa mean daily count. MARCH 2003
Global average number of observations in 24 hours = 73268

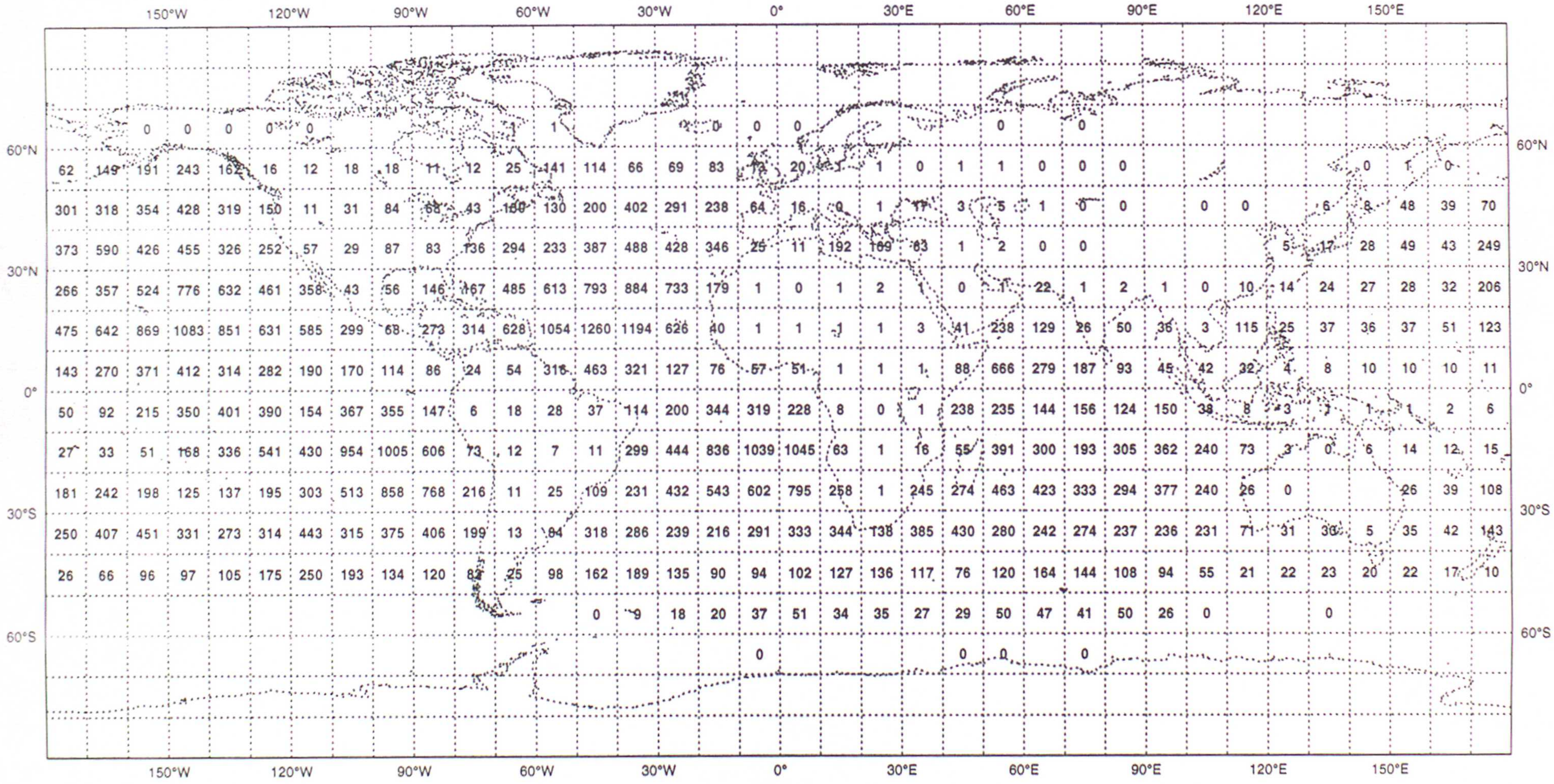

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 1 1 0 0 0 0 0
62 149 191 243 162 16 12 18 18 11 12 25 141 114 66 69 83 73 20 1 1 0 1 1 0 0 0 0 1 0
301 318 354 428 319 150 11 31 84 68 43 160 130 200 402 291 238 64 16 0 1 17 3 5 1 0 0 0 0 6 8 48 39 70
373 590 426 455 326 252 57 29 87 83 136 294 233 387 488 428 346 25 11 192 169 63 1 2 0 0 5 17 28 49 43 249
266 357 524 776 632 461 358 43 56 146 167 485 613 793 884 733 179 1 0 1 2 1 0 1 22 1 2 1 0 10 14 24 27 28 32 206
475 642 869 1083 851 631 585 299 68 273 314 628 1054 1260 1194 626 40 1 1 1 1 3 41 238 129 26 50 36 3 115 25 37 36 37 51 123
143 270 371 412 314 282 190 170 114 86 24 54 316 463 321 127 76 57 51 1 1 1 88 666 279 187 93 45 42 32 4 8 10 10 10 11
50 92 215 350 401 390 154 367 355 147 6 18 28 37 114 200 344 319 228 8 0 1 238 235 144 156 124 150 38 8 3 1 1 1 2 6
27 33 51 168 336 541 430 954 1005 606 73 12 7 11 299 444 836 1039 1045 63 1 16 55 391 300 193 305 362 240 73 3 0 6 14 12 15
181 242 198 125 137 195 303 513 858 768 216 11 25 109 231 432 543 602 795 258 1 245 274 463 423 333 294 377 240 26 0 26 39 108
250 407 451 331 273 314 443 315 375 406 199 13 84 318 286 239 216 291 333 344 138 385 430 280 242 274 237 236 231 71 31 30 5 35 42 143
26 66 96 97 105 175 250 193 134 120 82 25 98 162 189 135 90 94 102 127 136 117 76 120 164 144 108 94 55 21 22 23 20 22 17 10
0 9 18 20 37 51 34 35 27 29 50 47 41 50 26 0 0
0 0 0 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

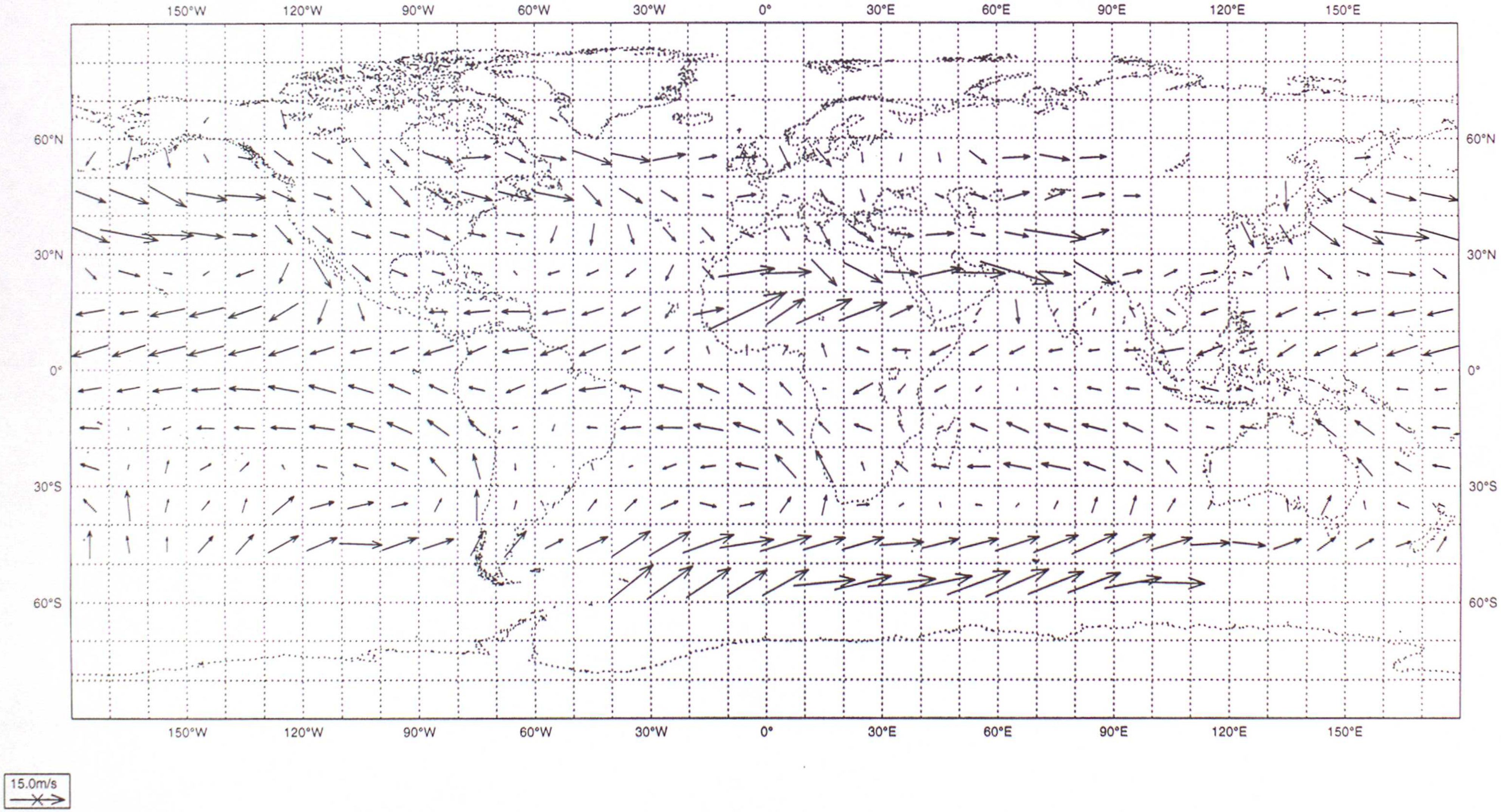

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

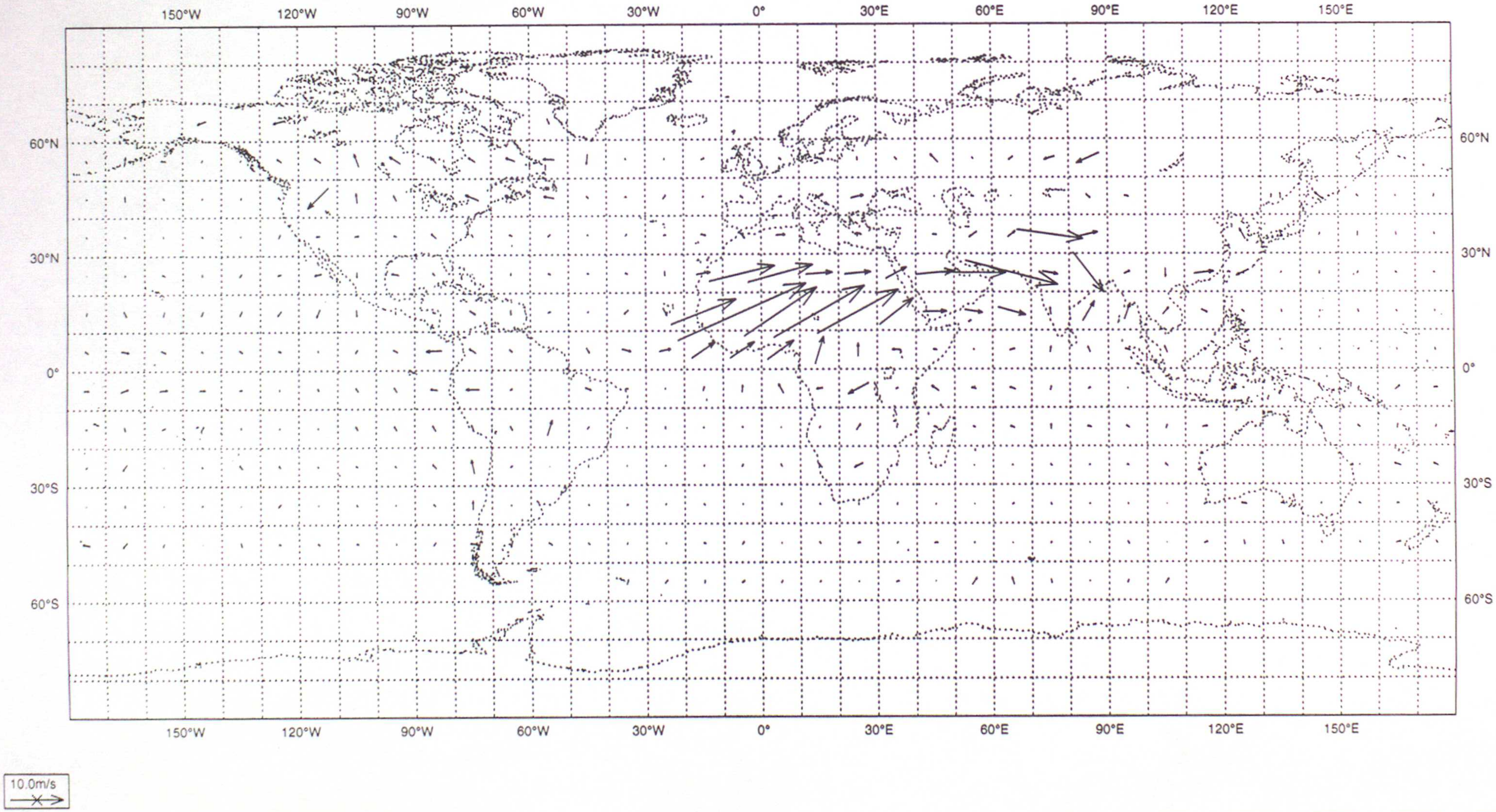

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present

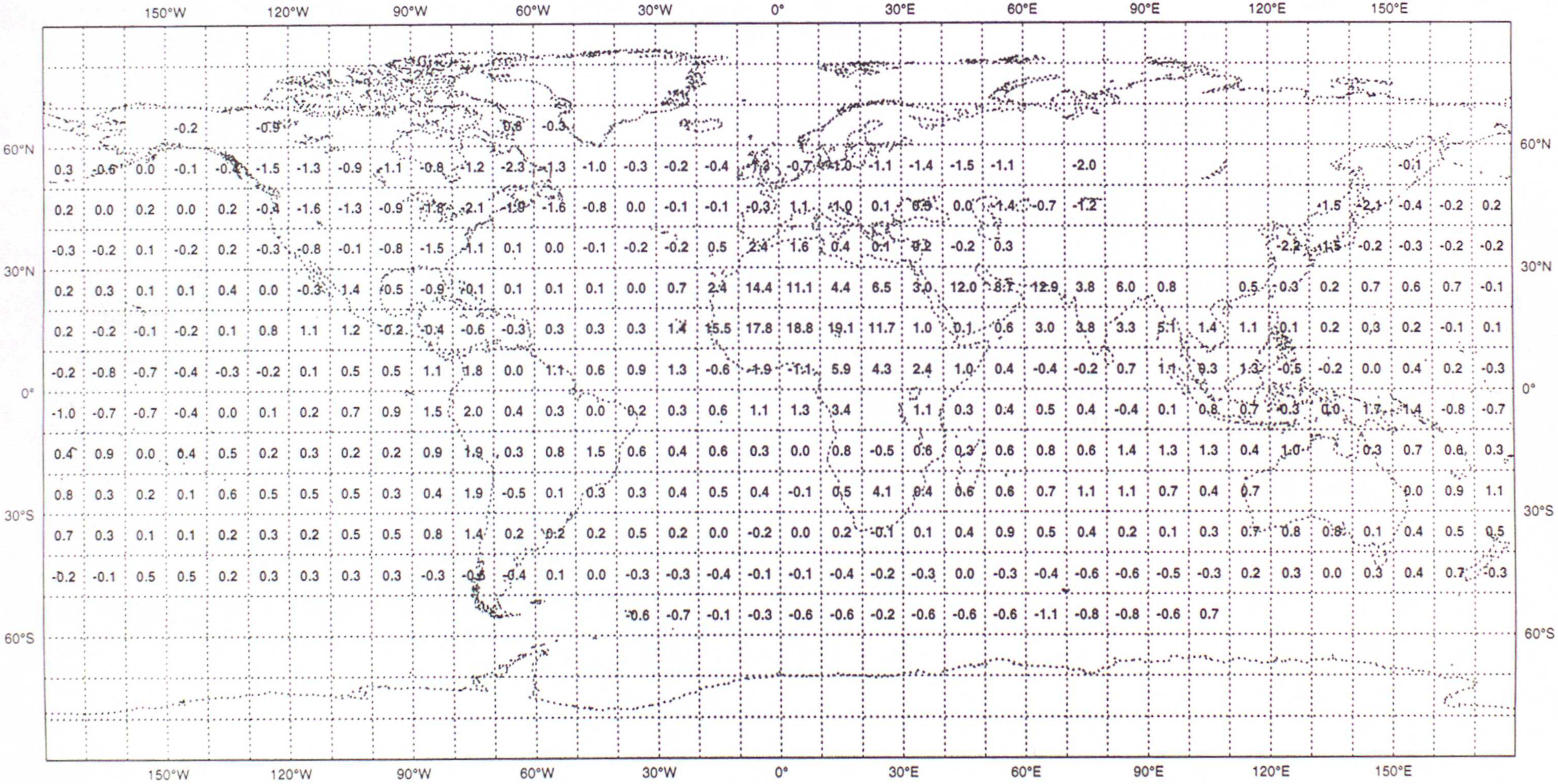

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.2 -0.9 0.8 -0.3
0.3 -0.6 0.0 -0.1 -0.4 -1.5 -1.3 -0.9 -1.1 -0.8 -1.2 -2.3 -1.3 -1.0 -0.3 -0.2 -0.4 -1.3 -0.7 -1.0 -1.1 -1.4 -1.5 -1.1 -2.0 -0.1
0.2 0.0 0.2 0.0 0.2 -0.4 -1.6 -1.3 -0.9 -1.8 -2.1 -1.9 -1.6 -0.8 0.0 -0.1 -0.1 -0.3 1.1 -1.0 0.1 0.9 0.0 -1.4 -0.7 -1.2 -1.5 -2.1 -0.4 -0.2 0.2
-0.3 -0.2 0.1 -0.2 0.2 -0.3 -0.8 -0.1 -0.8 -1.5 -1.1 0.1 0.0 -0.1 -0.2 -0.2 0.5 2.4 1.6 0.4 0.1 0.2 -0.2 0.3 -2.2 -1.5 -0.2 -0.3 -0.2 -0.2
0.2 0.3 0.1 0.1 0.4 0.0 -0.3 1.4 0.5 -0.9 0.1 0.1 0.1 0.1 0.0 0.7 2.4 14.4 11.1 4.4 6.5 3.0 12.0 8.7 12.9 3.8 6.0 0.8 0.5 0.3 0.2 0.7 0.6 0.7 -0.1
0.2 -0.2 -0.1 -0.2 0.1 0.8 1.1 1.2 -0.2 -0.4 -0.6 -0.3 0.3 0.3 0.3 1.4 15.5 17.8 18.8 19.1 11.7 1.0 0.1 0.6 3.0 3.8 3.3 5.1 1.4 1.1 0.1 0.2 0.3 0.2 -0.1 0.1
-0.2 -0.8 -0.7 -0.4 -0.3 -0.2 0.1 0.5 0.5 1.1 1.8 0.0 1.1 0.6 0.9 1.3 -0.6 -1.9 -1.1 5.9 4.3 2.4 1.0 0.4 -0.4 -0.2 0.7 1.1 0.3 1.3 -0.5 -0.2 0.0 0.4 0.2 -0.3
-1.0 -0.7 -0.7 -0.4 0.0 0.1 0.2 0.7 0.9 1.5 2.0 0.4 0.3 0.0 0.2 0.3 0.6 1.1 1.3 3.4 1.1 0.3 0.4 0.5 0.4 -0.4 0.1 0.8 0.7 -0.3 0.0 1.7 1.4 -0.8 -0.7
0.4 0.9 0.0 0.4 0.5 0.2 0.3 0.2 0.2 0.9 1.9 0.3 0.8 1.5 0.6 0.4 0.6 0.3 0.0 0.8 -0.5 0.6 0.3 0.6 0.8 0.6 1.4 1.3 1.3 0.4 1.0 0.3 0.7 0.8 0.3
0.8 0.3 0.2 0.1 0.6 0.5 0.5 0.5 0.3 0.4 1.9 -0.5 0.1 0.3 0.3 0.4 0.5 0.4 -0.1 0.5 4.1 0.4 0.6 0.6 0.7 1.1 1.1 0.7 0.4 0.7 0.0 0.9 1.1
0.7 0.3 0.1 0.1 0.2 0.3 0.2 0.5 0.5 0.8 1.4 0.2 0.2 0.2 0.5 0.2 0.0 -0.2 0.0 0.2 -0.1 0.1 0.4 0.9 0.5 0.4 0.2 0.1 0.3 0.7 0.8 0.8 0.1 0.4 0.5 0.5
-0.2 -0.1 0.5 0.5 0.2 0.3 0.3 0.3 0.3 -0.3 -0.5 -0.4 0.1 0.0 -0.3 -0.3 -0.4 -0.1 -0.1 -0.4 -0.2 -0.3 0.0 -0.3 -0.4 -0.6 -0.6 -0.5 -0.3 0.2 0.3 0.0 0.3 0.4 0.7 -0.3
-0.6 -0.7 -0.1 -0.3 -0.6 -0.6 -0.2 -0.6 -0.6 -0.6 -1.1 -0.8 -0.8 -0.6 0.7

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present

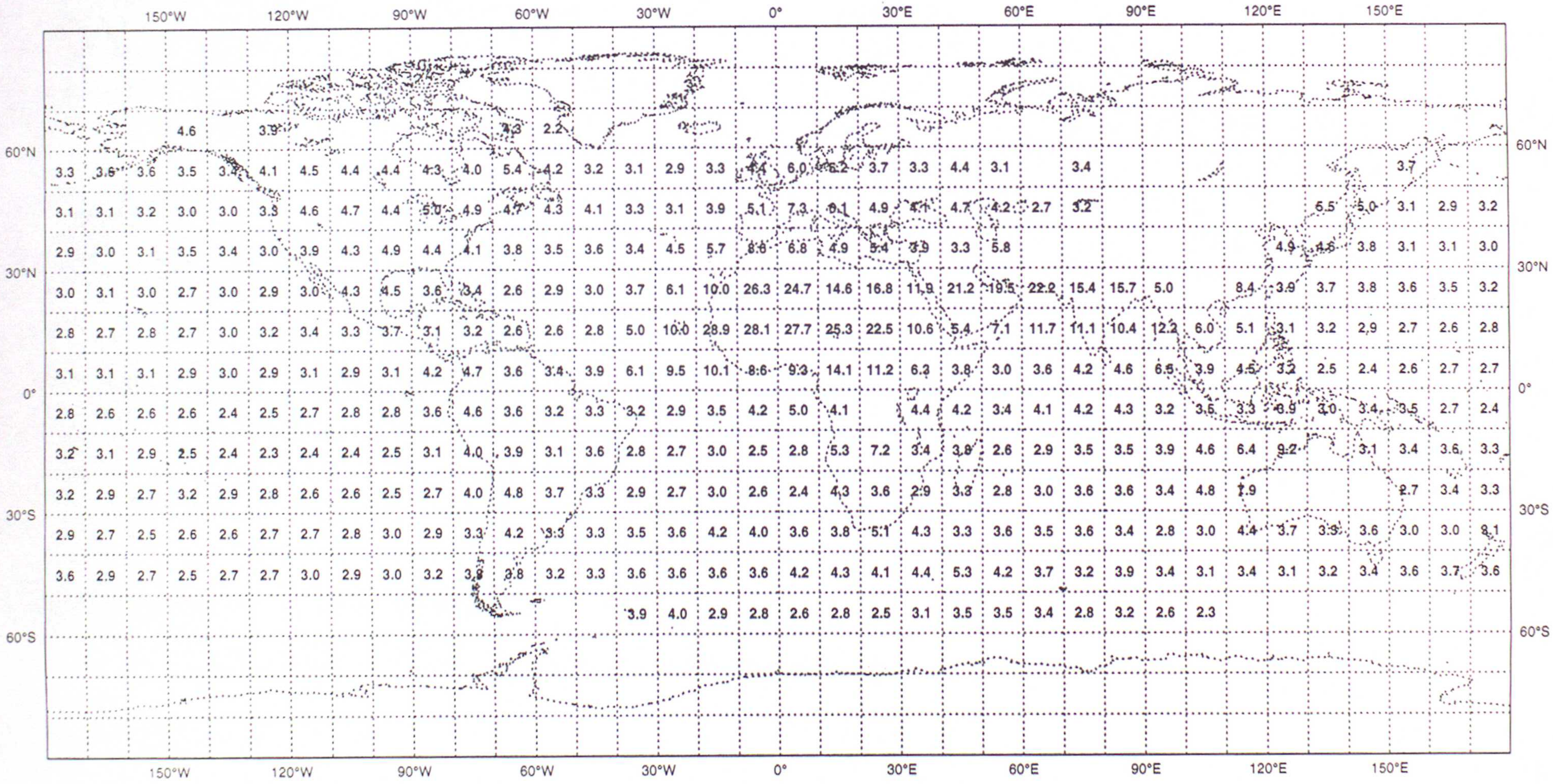

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 15. SATOB 401 - 700 hPa mean daily count. MARCH 2003
Global average number of observations in 24 hours = 15159

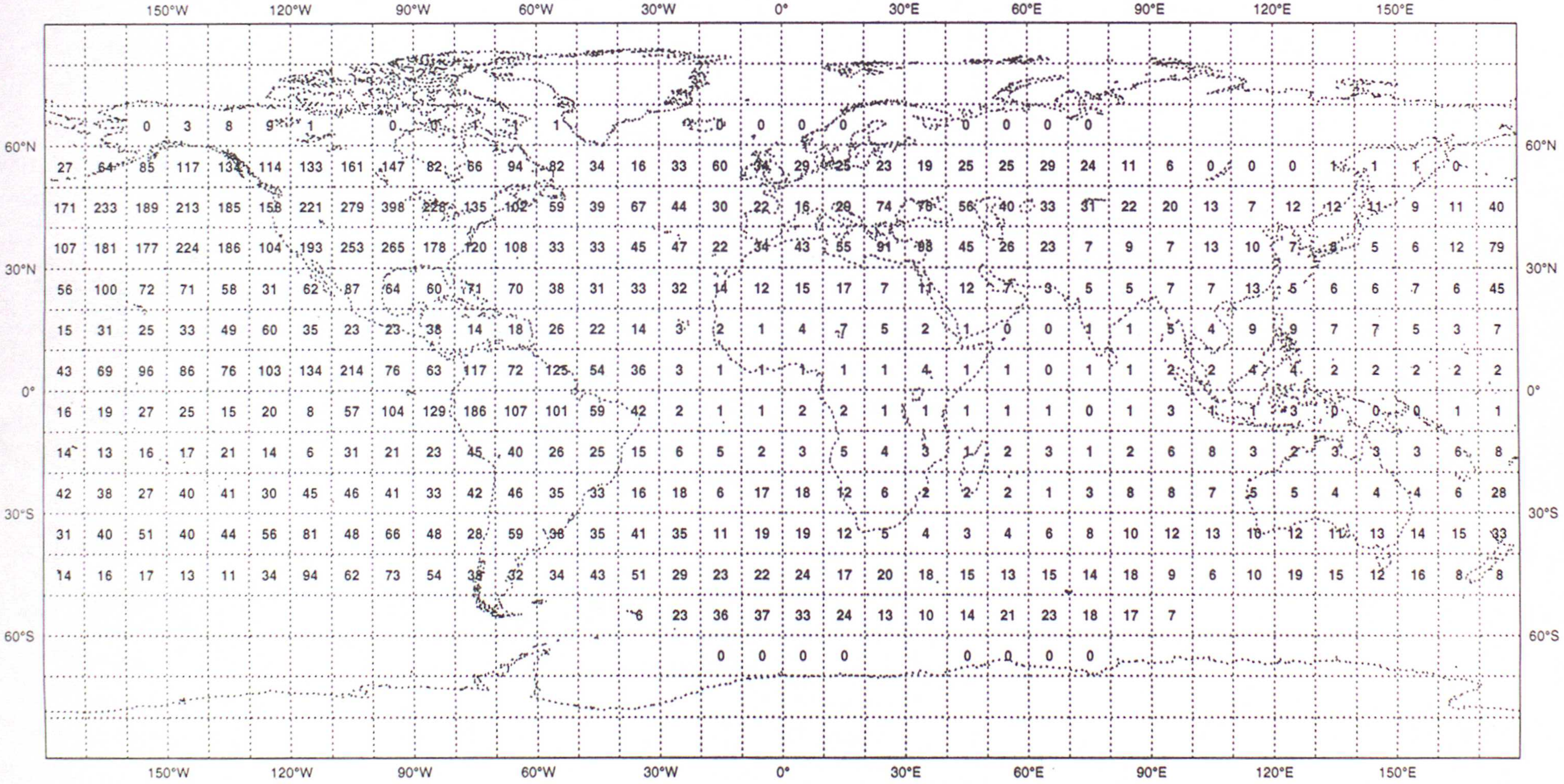

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0 3 8 9 1 0 0 1 1 1 0 0 0 0 0 0 0 0
27 64 85 117 134 114 133 161 147 82 66 94 82 34 16 33 60 34 29 25 23 19 25 25 29 24 11 6 0 0 0 1 1 1 0
171 233 189 213 185 158 221 279 398 228 135 102 59 39 67 44 30 22 16 29 74 76 56 40 33 31 22 20 13 7 12 12 11 9 11 40
107 181 177 224 186 104 193 253 265 178 120 108 33 33 45 47 22 34 43 55 91 98 45 26 23 7 9 7 13 10 7 8 5 6 12 79
56 100 72 71 58 31 62 87 64 60 71 70 38 31 33 32 14 12 15 17 7 11 12 7 3 5 5 7 7 13 5 6 6 7 6 45
15 31 25 33 49 60 35 23 23 38 14 18 26 22 14 3 2 1 4 7 5 2 1 0 0 1 1 5 4 9 9 7 7 5 3 7
43 69 96 86 76 103 134 214 76 63 117 72 125 54 36 3 1 1 1 1 1 4 1 1 0 1 1 2 2 4 4 2 2 2 2 2
16 19 27 25 15 20 8 57 104 129 186 107 101 59 42 2 1 1 2 2 1 1 1 1 1 0 1 3 1 1 3 0 0 0 1 1
14 13 16 17 21 14 6 31 21 23 45 40 26 25 15 6 5 2 3 5 4 3 1 2 3 1 2 6 8 3 2 3 3 3 6 8
42 38 27 40 41 30 45 46 41 33 42 46 35 33 16 18 6 17 18 12 6 2 2 2 1 3 8 8 7 5 5 4 4 4 6 28
31 40 51 40 44 56 81 48 66 48 28 59 38 35 41 35 11 19 19 12 5 4 3 4 6 8 10 12 13 10 12 11 13 14 15 33
14 16 17 13 11 34 94 62 73 54 38 32 34 43 51 29 23 22 24 17 20 18 15 13 15 14 18 9 6 10 19 15 12 16 8 8
6 23 36 37 33 24 13 10 14 21 23 18 17 7
0 0 0 0 0 0 0 0

Figure 16. SATOB 401 - 700 hPa vector mean wind. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

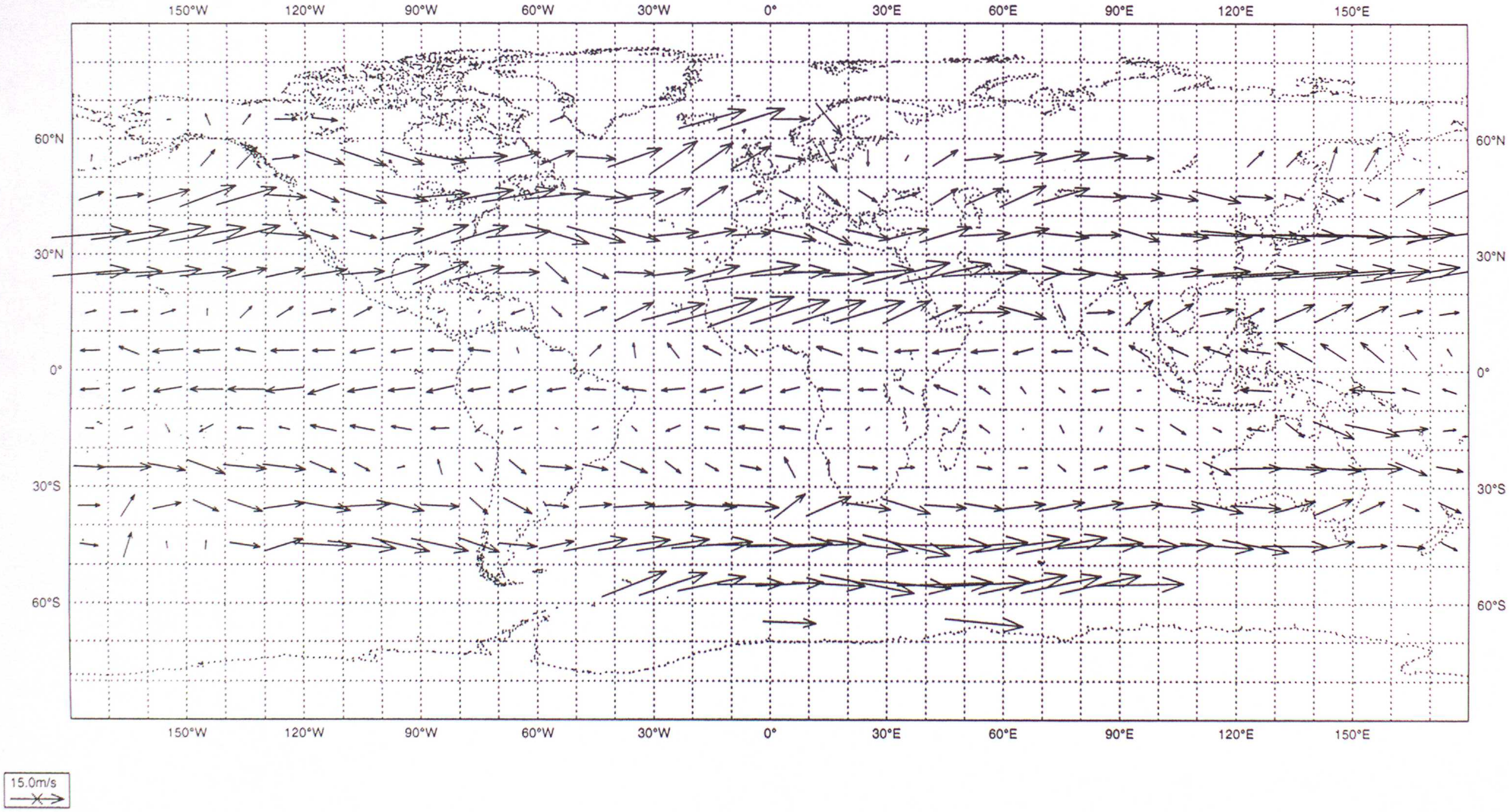

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

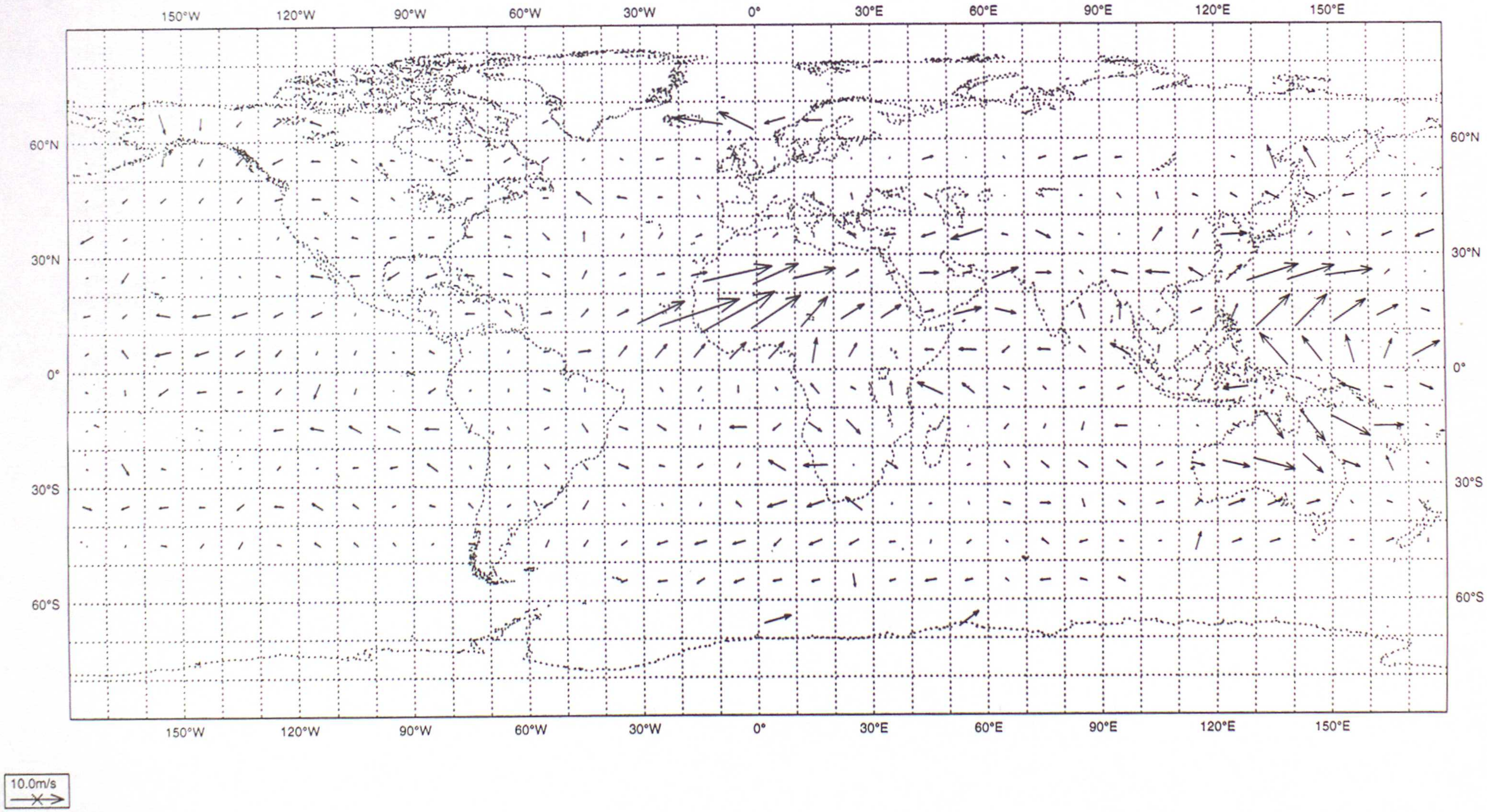

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present

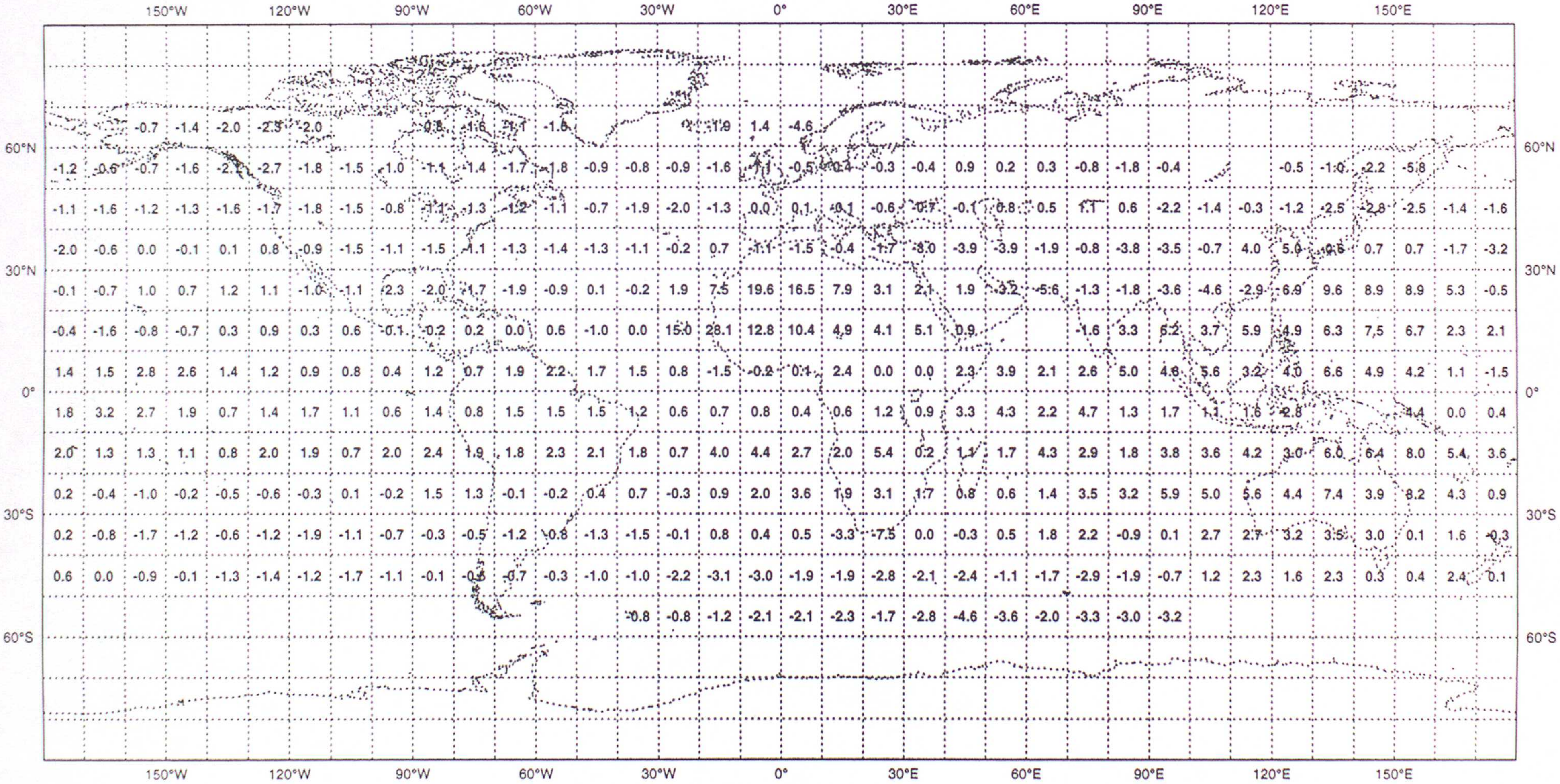

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.7 -1.4 -2.0 -2.3 -2.0 -0.8 1.6 1.1 -1.6 -1.9 1.4 -4.6
-1.2 -0.6 -0.7 -1.6 -2.1 -2.7 -1.8 -1.5 -1.0 -1.1 -1.4 -1.7 -1.8 -0.9 -0.8 -0.9 -1.6 1.1 -0.5 -0.4 -0.3 -0.4 0.9 0.2 0.3 -0.8 -1.8 -0.4 -0.5 -1.0 -2.2 -5.8
-1.1 -1.6 -1.2 -1.3 -1.6 -1.7 -1.8 -1.5 -0.8 -1.1 -1.3 -1.2 -1.1 -0.7 -1.9 -2.0 -1.3 0.0 0.1 -0.1 -0.6 -0.7 -0.1 0.8 0.5 1.1 0.6 -2.2 -1.4 -0.3 -1.2 -2.5 -2.8 -2.5 -1.4 -1.6
-2.0 -0.6 0.0 -0.1 0.1 0.8 -0.9 -1.5 -1.1 -1.5 -1.1 -1.3 -1.4 -1.3 -1.1 -0.2 0.7 -1.1 -1.5 -0.4 -1.7 -8.0 -3.9 -3.9 -1.9 -0.8 -3.8 -3.5 -0.7 4.0 5.0 -0.6 0.7 0.7 -1.7 -3.2
-0.1 -0.7 1.0 0.7 1.2 1.1 -1.0 -1.1 2.3 -2.0 -1.7 -1.9 -0.9 0.1 -0.2 1.9 7.5 19.6 16.5 7.9 3.1 2.1 1.9 -3.2 -5.6 -1.3 -1.8 -3.6 -4.6 -2.9 -6.9 9.6 8.9 8.9 5.3 -0.5
-0.4 -1.6 -0.8 -0.7 0.3 0.9 0.3 0.6 -0.1 -0.2 0.2 0.0 0.6 -1.0 0.0 15.0 28.1 12.8 10.4 4.9 4.1 5.1 0.9 -1.6 3.3 6.2 3.7 5.9 4.9 6.3 7.5 6.7 2.3 2.1
1.4 1.5 2.8 2.6 1.4 1.2 0.9 0.8 0.4 1.2 0.7 1.9 2.2 1.7 1.5 0.8 -1.5 -0.2 0.1 2.4 0.0 0.0 2.3 3.9 2.1 2.6 5.0 4.6 5.6 3.2 4.0 6.6 4.9 4.2 1.1 -1.5
1.8 3.2 2.7 1.9 0.7 1.4 1.7 1.1 0.6 1.4 0.8 1.5 1.5 1.5 1.2 0.6 0.7 0.8 0.4 0.6 1.2 0.9 3.3 4.3 2.2 4.7 1.3 1.7 1.1 1.6 2.8 4.4 0.0 0.4
2.0 1.3 1.3 1.1 0.8 2.0 1.9 0.7 2.0 2.4 1.9 1.8 2.3 2.1 1.8 0.7 4.0 4.4 2.7 2.0 5.4 0.2 1.1 1.7 4.3 2.9 1.8 3.8 3.6 4.2 3.0 6.0 6.4 8.0 5.4 3.6
0.2 -0.4 -1.0 -0.2 -0.5 -0.6 -0.3 0.1 -0.2 1.5 1.3 -0.1 -0.2 0.4 0.7 -0.3 0.9 2.0 3.6 1.9 3.1 1.7 0.8 0.6 1.4 3.5 3.2 5.9 5.0 5.6 4.4 7.4 3.9 8.2 4.3 0.9
0.2 -0.8 -1.7 -1.2 -0.6 -1.2 -1.9 -1.1 -0.7 -0.3 -0.5 -1.2 -0.8 -1.3 -1.5 -0.1 0.8 0.4 0.5 -3.3 -7.5 0.0 -0.3 0.5 1.8 2.2 -0.9 0.1 2.7 2.7 3.2 3.5 3.0 0.1 1.6 -0.3
0.6 0.0 -0.9 -0.1 -1.3 -1.4 -1.2 -1.7 -1.1 -0.1 -0.6 -0.7 -0.3 -1.0 -1.0 -2.2 -3.1 -3.0 -1.9 -1.9 -2.8 -2.1 -2.4 -1.1 -1.7 -2.9 -1.9 -0.7 1.2 2.3 1.6 2.3 0.3 0.4 2.4 0.1
-0.8 -0.8 -1.2 -2.1 -2.1 -2.3 -1.7 -2.8 -4.6 -3.6 -2.0 -3.3 -3.0 -3.2

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present

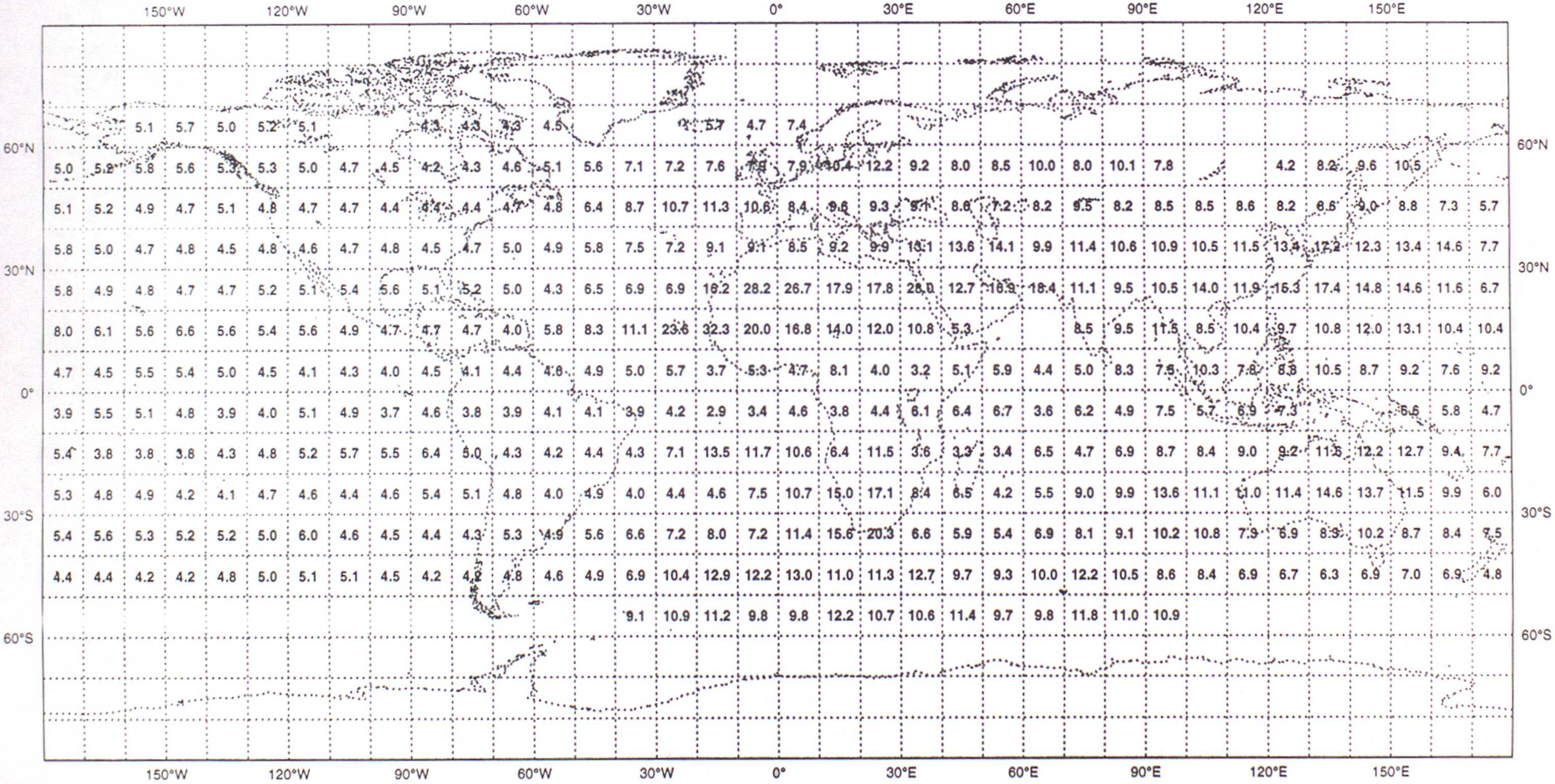
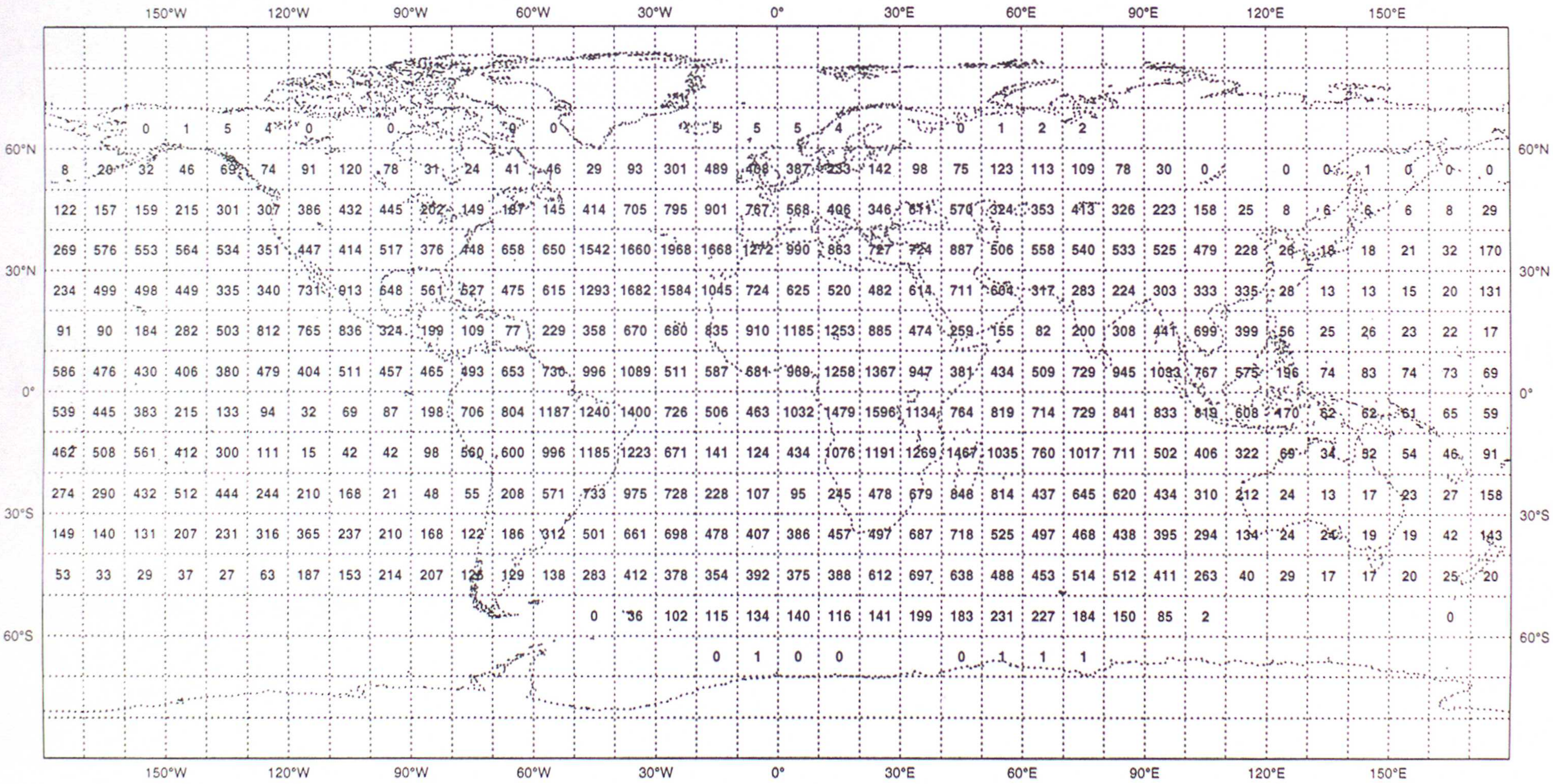

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
5.1 5.7 5.0 5.2 5.1 4.3 4.3 4.3 4.5 5.7 4.7 7.4
5.0 5.2 5.8 5.6 5.3 5.3 5.0 4.7 4.5 4.2 4.3 4.6 5.1 5.6 7.1 7.2 7.6 7.8 7.9 10.4 12.2 9.2 8.0 8.5 10.0 8.0 10.1 7.8 4.2 8.2 9.6 10.5
5.1 5.2 4.9 4.7 5.1 4.8 4.7 4.7 4.4 4.4 4.4 4.7 4.8 6.4 8.7 10.7 11.3 10.6 8.4 9.6 9.3 9.1 8.6 7.2 8.2 9.5 8.2 8.5 8.5 8.6 8.2 6.6 9.0 8.8 7.3 5.7
5.8 5.0 4.7 4.8 4.5 4.8 4.6 4.7 4.8 4.5 4.7 5.0 4.9 5.8 7.5 7.2 9.1 9.1 8.5 9.2 9.9 10.1 13.6 14.1 9.9 11.4 10.6 10.9 10.5 11.5 13.4 17.2 12.3 13.4 14.6 7.7
5.8 4.9 4.8 4.7 4.7 5.2 5.1 5.4 5.6 5.1 5.2 5.0 4.3 6.5 6.9 6.9 16.2 28.2 26.7 17.9 17.8 28.0 12.7 16.9 18.4 11.1 9.5 10.5 14.0 11.9 15.3 17.4 14.8 14.6 11.6 6.7
8.0 6.1 5.6 6.6 5.6 5.4 5.6 4.9 4.7 4.7 4.7 4.0 5.8 8.3 11.1 23.6 32.3 20.0 16.8 14.0 12.0 10.8 5.3 8.5 9.5 11.5 8.5 10.4 9.7 10.8 12.0 13.1 10.4 10.4
4.7 4.5 5.5 5.4 5.0 4.5 4.1 4.3 4.0 4.5 4.1 4.4 4.8 4.9 5.0 5.7 3.7 5.3 4.7 8.1 4.0 3.2 5.1 5.9 4.4 5.0 8.3 7.5 10.3 7.8 8.8 10.5 8.7 9.2 7.6 9.2
3.9 5.5 5.1 4.8 3.9 4.0 5.1 4.9 3.7 4.6 3.8 3.9 4.1 4.1 3.9 4.2 2.9 3.4 4.6 3.8 4.4 6.1 6.4 6.7 3.6 6.2 4.9 7.5 5.7 6.9 7.3 6.6 5.8 4.7
5.4 3.8 3.8 3.8 4.3 4.8 5.2 5.7 5.5 6.4 5.0 4.3 4.2 4.4 4.3 7.1 13.5 11.7 10.6 6.4 11.5 3.6 3.3 3.4 6.5 4.7 6.9 8.7 8.4 9.0 9.2 11.6 12.2 12.7 9.4 7.7
5.3 4.8 4.9 4.2 4.1 4.7 4.6 4.4 4.6 5.4 5.1 4.8 4.0 4.9 4.0 4.4 4.6 7.5 10.7 15.0 17.1 8.4 6.5 4.2 5.5 9.0 9.9 13.6 11.1 11.0 11.4 14.6 13.7 11.5 9.9 6.0
5.4 5.6 5.3 5.2 5.2 5.0 6.0 4.6 4.5 4.4 4.3 5.3 4.9 5.6 6.6 7.2 8.0 7.2 11.4 15.6 20.3 6.6 5.9 5.4 6.9 8.1 9.1 10.2 10.8 7.9 6.9 8.9 10.2 8.7 8.4 7.5
4.4 4.4 4.2 4.2 4.8 5.0 5.1 5.1 4.5 4.2 4.2 4.8 4.6 4.9 6.9 10.4 12.9 12.2 13.0 11.0 11.3 12.7 9.7 9.3 10.0 12.2 10.5 8.6 8.4 6.9 6.7 6.3 6.9 7.0 6.9 4.8
9.1 10.9 11.2 9.8 9.8 12.2 10.7 10.6 11.4 9.7 9.8 11.8 11.0 10.9

Figure 20. SATOB 101 - 400 hPa mean daily count. MARCH 2003
Global average number of observations in 24 hours = 164970



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 5 | 4 | 0 | | 0 | | | 0 | 0 | | | | 5 | 5 | 5 | 4 | | | 0 | 1 | 2 | 2 | | | | | | | | | | |
| 8 | 20 | 32 | 46 | 69 | 74 | 91 | 120 | 78 | 31 | 24 | 41 | 46 | 29 | 93 | 301 | 489 | 408 | 387 | 233 | 142 | 98 | 75 | 123 | 113 | 109 | 78 | 30 | 0 | | 0 | 0 | 1 | 0 | 0 | 0 |
| 122 | 157 | 159 | 215 | 301 | 307 | 386 | 432 | 445 | 202 | 149 | 187 | 145 | 414 | 705 | 795 | 901 | 767 | 568 | 406 | 346 | 611 | 570 | 324 | 353 | 413 | 326 | 223 | 158 | 25 | 8 | 6 | 6 | 6 | 8 | 29 |
| 269 | 576 | 553 | 564 | 534 | 351 | 447 | 414 | 517 | 376 | 448 | 658 | 650 | 1542 | 1660 | 1968 | 1668 | 1272 | 990 | 863 | 727 | 724 | 887 | 506 | 558 | 540 | 533 | 525 | 479 | 228 | 26 | 18 | 18 | 21 | 32 | 170 |
| 234 | 499 | 498 | 449 | 335 | 340 | 731 | 913 | 648 | 561 | 527 | 475 | 615 | 1293 | 1682 | 1584 | 1045 | 724 | 625 | 520 | 482 | 614 | 711 | 604 | 317 | 283 | 224 | 303 | 333 | 335 | 28 | 13 | 13 | 15 | 20 | 131 |
| 91 | 90 | 184 | 282 | 503 | 812 | 765 | 836 | 324 | 199 | 109 | 77 | 229 | 358 | 670 | 680 | 835 | 910 | 1185 | 1253 | 885 | 474 | 259 | 155 | 82 | 200 | 308 | 441 | 699 | 399 | 56 | 25 | 26 | 23 | 22 | 17 |
| 586 | 476 | 430 | 406 | 380 | 479 | 404 | 511 | 457 | 465 | 493 | 653 | 730 | 996 | 1089 | 511 | 587 | 681 | 989 | 1258 | 1367 | 947 | 381 | 434 | 509 | 729 | 945 | 1093 | 767 | 575 | 196 | 74 | 83 | 74 | 73 | 69 |
| 539 | 445 | 383 | 215 | 133 | 94 | 32 | 69 | 87 | 198 | 706 | 804 | 1187 | 1240 | 1400 | 726 | 506 | 463 | 1032 | 1479 | 1596 | 1134 | 764 | 819 | 714 | 729 | 841 | 833 | 819 | 608 | 470 | 62 | 62 | 61 | 65 | 59 |
| 462 | 508 | 561 | 412 | 300 | 111 | 15 | 42 | 42 | 98 | 560 | 600 | 996 | 1185 | 1223 | 671 | 141 | 124 | 434 | 1076 | 1191 | 1269 | 1467 | 1035 | 760 | 1017 | 711 | 502 | 406 | 322 | 69 | 34 | 52 | 54 | 46 | 91 |
| 274 | 290 | 432 | 512 | 444 | 244 | 210 | 168 | 21 | 48 | 55 | 208 | 571 | 733 | 975 | 728 | 228 | 107 | 95 | 245 | 478 | 679 | 848 | 814 | 437 | 645 | 620 | 434 | 310 | 212 | 24 | 13 | 17 | 23 | 27 | 158 |
| 149 | 140 | 131 | 207 | 231 | 316 | 365 | 237 | 210 | 168 | 122 | 186 | 312 | 501 | 661 | 698 | 478 | 407 | 386 | 457 | 497 | 687 | 718 | 525 | 497 | 468 | 438 | 395 | 294 | 134 | 24 | 24 | 19 | 19 | 42 | 143 |
| 53 | 33 | 29 | 37 | 27 | 63 | 187 | 153 | 214 | 207 | 125 | 129 | 138 | 283 | 412 | 378 | 354 | 392 | 375 | 388 | 612 | 697 | 638 | 488 | 453 | 514 | 512 | 411 | 263 | 40 | 29 | 17 | 17 | 20 | 25 | 20 |
| | | | | | | | | | | | | | 0 | 36 | 102 | 115 | 134 | 140 | 116 | 141 | 199 | 183 | 231 | 227 | 184 | 150 | 85 | 2 | | | | | | 0 | |
| | | | | | | | | | | | | | | | | 0 | 1 | 0 | 0 | | | 0 | 1 | 1 | 1 | | | | | | | | | | |

Figure 21. SATOB 101 - 400 hPa vector mean wind. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

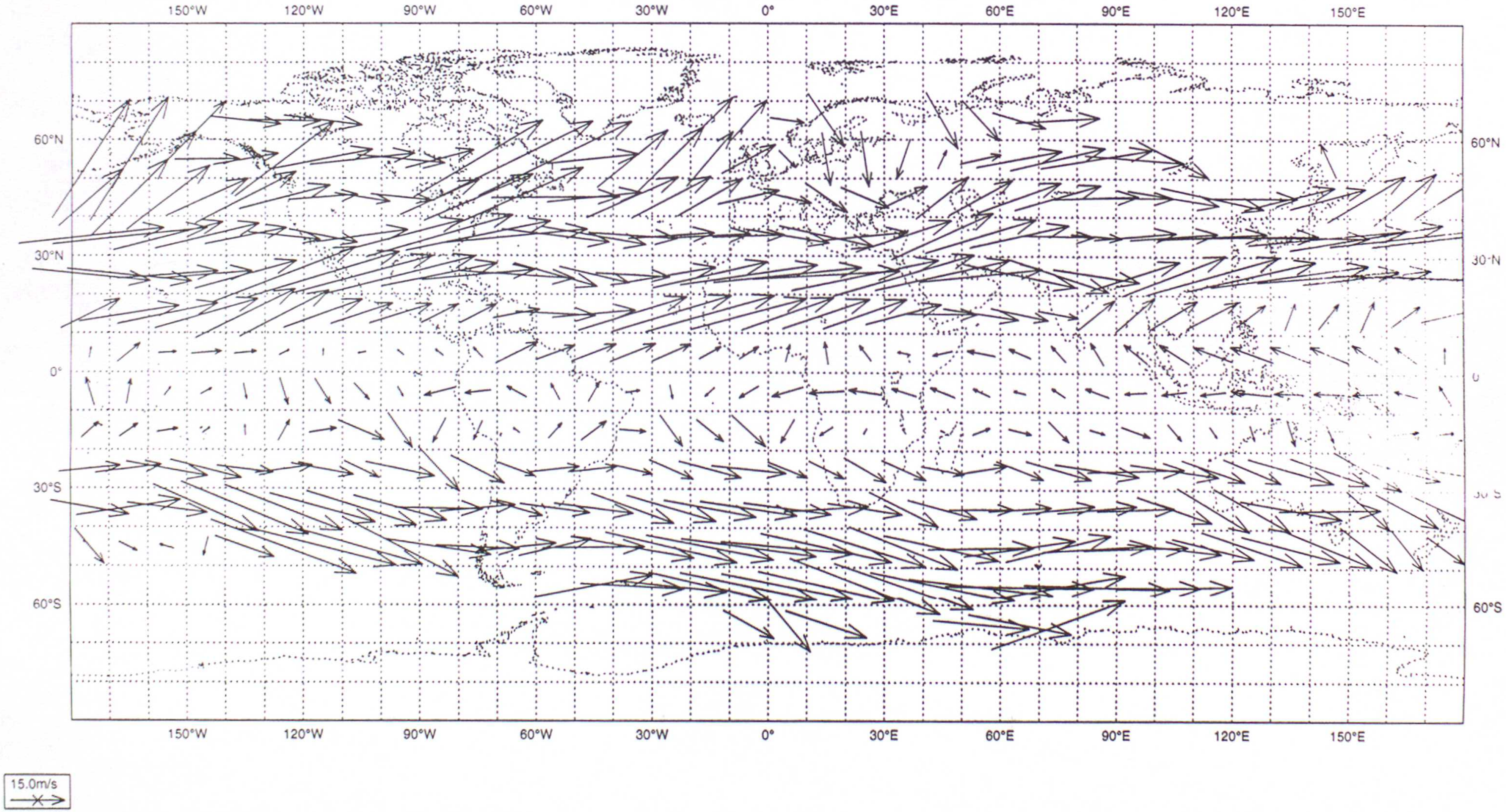

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. MARCH 2003
All observations
Arrows are plotted where greater than 10 obs are present

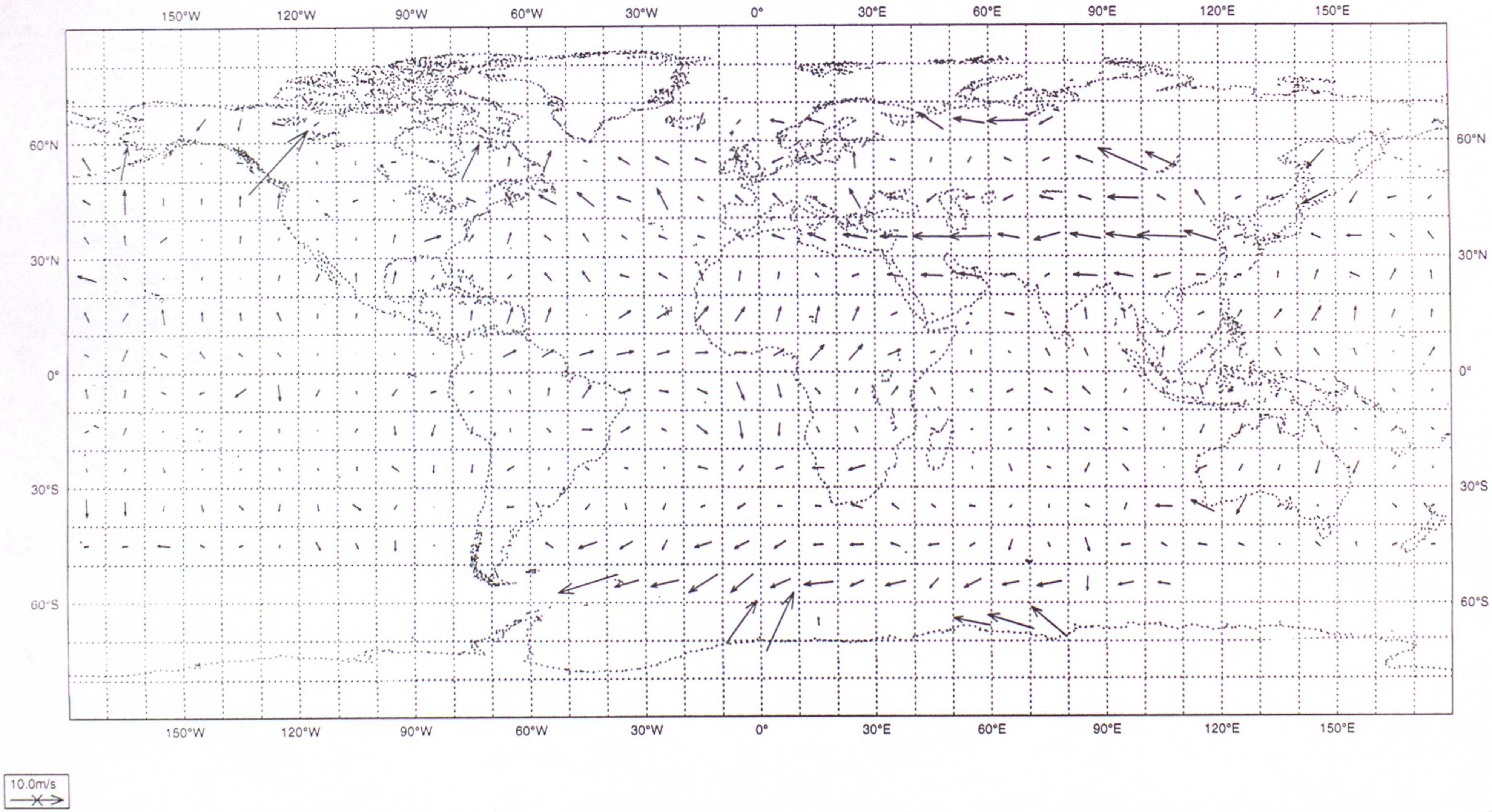

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present

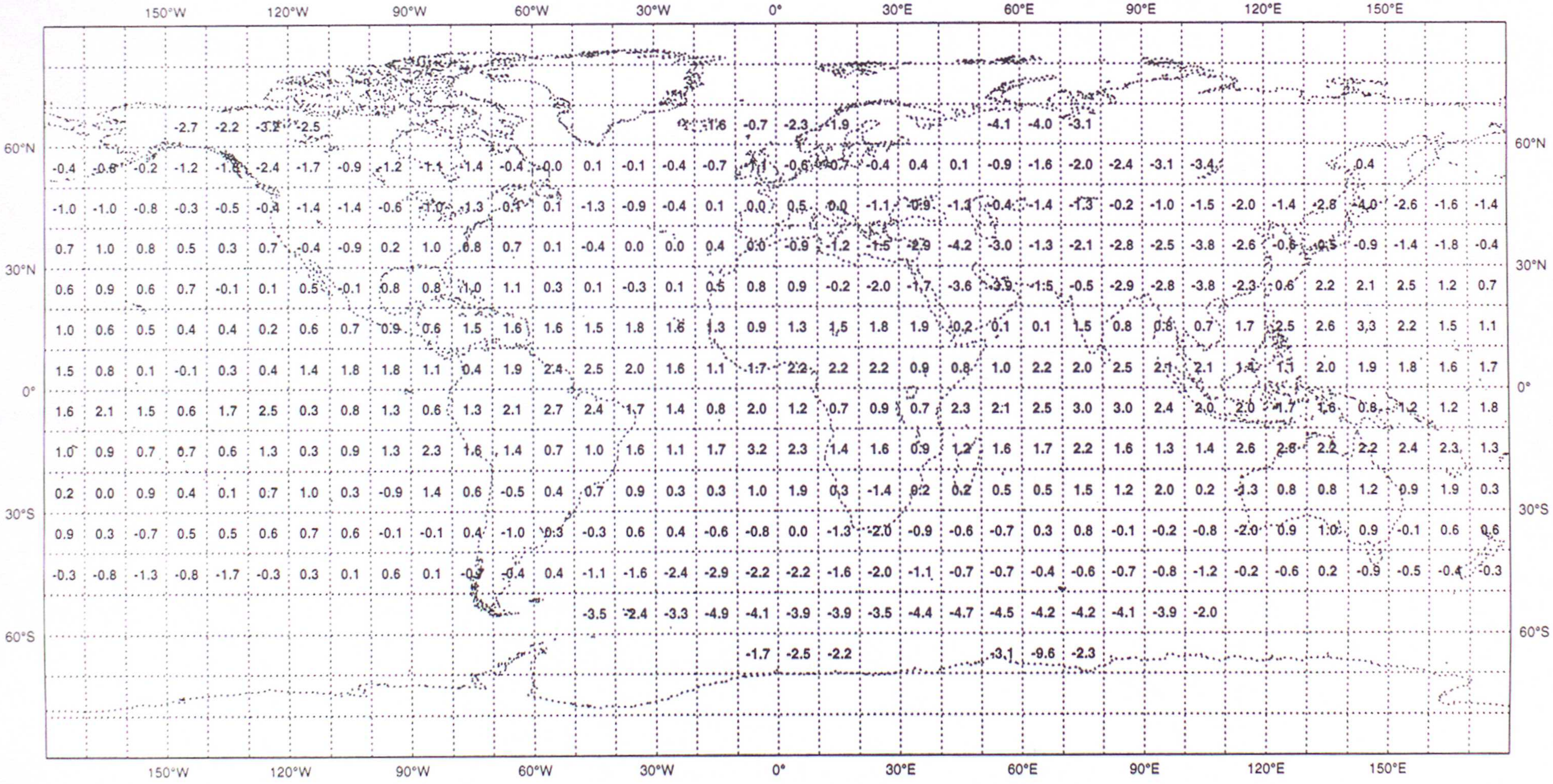
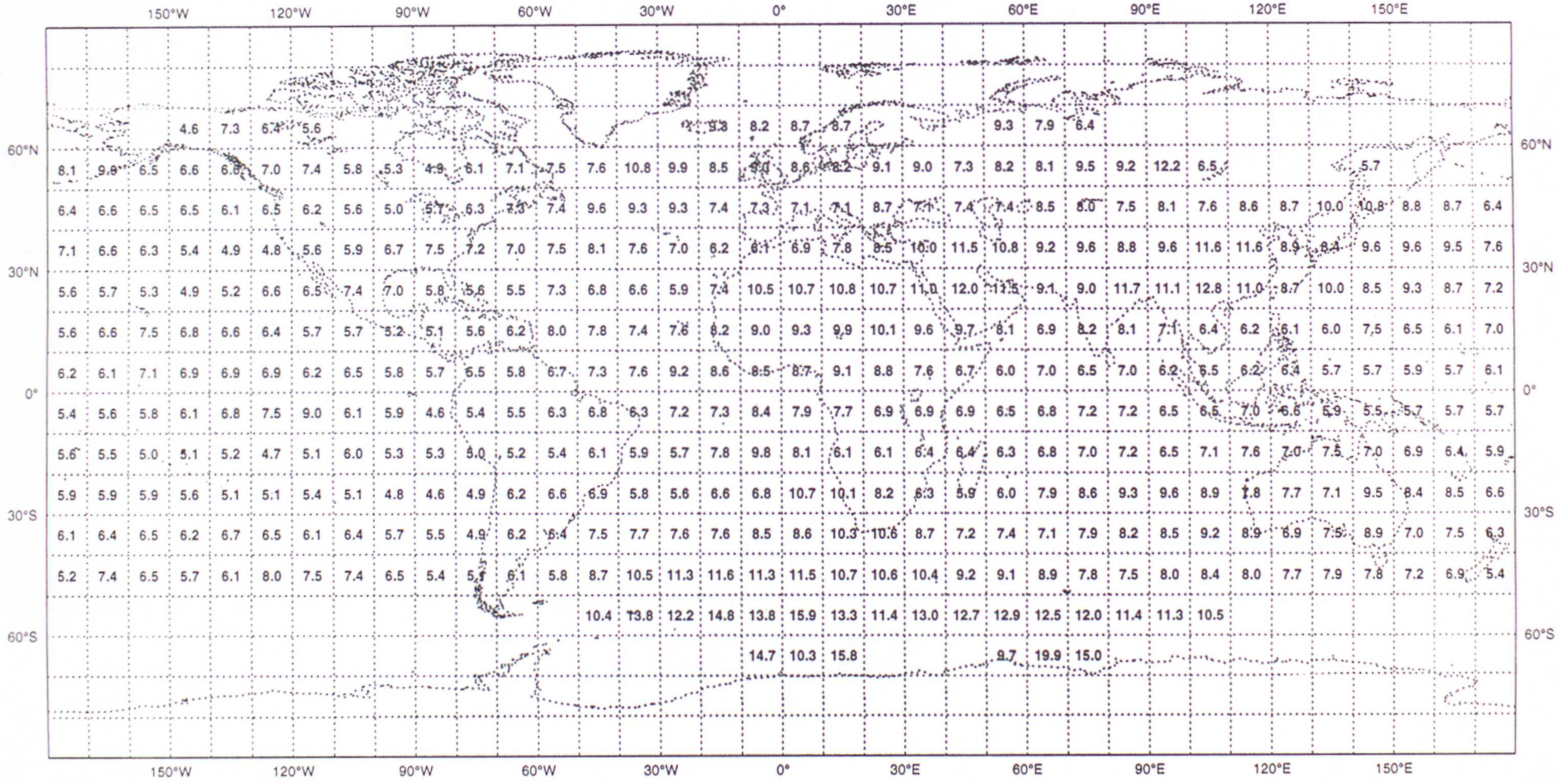

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-2.7 -2.2 -3.2 -2.5 1.6 -0.7 -2.3 1.9 -4.1 -4.0 -3.1
-0.4 -0.6 -0.2 -1.2 -1.8 -2.4 -1.7 -0.9 -1.2 -1.1 -1.4 -0.4 -0.0 0.1 -0.1 -0.4 -0.7 -1.1 -0.6 -0.7 -0.4 0.4 0.1 -0.9 -1.6 -2.0 -2.4 -3.1 -3.4 0.4
-1.0 -1.0 -0.8 -0.3 -0.5 -0.4 -1.4 -1.4 -0.6 -1.0 -1.3 -0.1 0.1 -1.3 -0.9 -0.4 0.1 0.0 0.5 0.0 -1.1 -0.9 -1.3 -0.4 -1.4 -1.3 -0.2 -1.0 -1.5 -2.0 -1.4 -2.8 -4.0 -2.6 -1.6 -1.4
0.7 1.0 0.8 0.5 0.3 0.7 -0.4 -0.9 0.2 1.0 0.8 0.7 0.1 -0.4 0.0 0.0 0.4 0.0 -0.9 -1.2 -1.5 -2.9 -4.2 -3.0 -1.3 -2.1 -2.8 -2.5 -3.8 -2.6 -0.6 -0.5 -0.9 -1.4 -1.8 -0.4
0.6 0.9 0.6 0.7 -0.1 0.1 0.5 -0.1 0.8 0.8 1.0 1.1 0.3 0.1 -0.3 0.1 0.5 0.8 0.9 -0.2 -2.0 -1.7 -3.6 -3.9 -1.5 -0.5 -2.9 -2.8 -3.8 -2.3 0.6 2.2 2.1 2.5 1.2 0.7
1.0 0.6 0.5 0.4 0.4 0.2 0.6 0.7 0.9 0.6 1.5 1.6 1.6 1.5 1.8 1.6 1.3 0.9 1.3 1.5 1.8 1.9 -0.2 0.1 0.1 1.5 0.8 0.8 0.7 1.7 2.5 2.6 3.3 2.2 1.5 1.1
1.5 0.8 0.1 -0.1 0.3 0.4 1.4 1.8 1.8 1.1 0.4 1.9 2.4 2.5 2.0 1.6 1.1 1.7 2.2 2.2 2.2 0.9 0.8 1.0 2.2 2.0 2.5 2.1 2.1 1.4 1.1 2.0 1.9 1.8 1.6 1.7
1.6 2.1 1.5 0.6 1.7 2.5 0.3 0.8 1.3 0.6 1.3 2.1 2.7 2.4 1.7 1.4 0.8 2.0 1.2 0.7 0.9 0.7 2.3 2.1 2.5 3.0 3.0 2.4 2.0 2.0 1.7 1.6 0.8 1.2 1.2 1.8
1.0 0.9 0.7 0.7 0.6 1.3 0.3 0.9 1.3 2.3 1.6 1.4 0.7 1.0 1.6 1.1 1.7 3.2 2.3 1.4 1.6 0.9 1.2 1.6 1.7 2.2 1.6 1.3 1.4 2.6 2.6 2.2 2.2 2.4 2.3 1.3
0.2 0.0 0.9 0.4 0.1 0.7 1.0 0.3 -0.9 1.4 0.6 -0.5 0.4 0.7 0.9 0.3 0.3 1.0 1.9 0.3 -1.4 0.2 0.2 0.5 0.5 1.5 1.2 2.0 0.2 -1.3 0.8 0.8 1.2 0.9 1.9 0.3
0.9 0.3 -0.7 0.5 0.5 0.6 0.7 0.6 -0.1 -0.1 0.4 -1.0 0.3 -0.3 0.6 0.4 -0.6 -0.8 0.0 -1.3 -2.0 -0.9 -0.6 -0.7 0.3 0.8 -0.1 -0.2 -0.8 -2.0 0.9 1.0 0.9 -0.1 0.6 0.6
-0.3 -0.8 -1.3 -0.8 -1.7 -0.3 0.3 0.1 0.6 0.1 -0.7 -0.4 0.4 -1.1 -1.6 -2.4 -2.9 -2.2 -2.2 -1.6 -2.0 -1.1 -0.7 -0.7 -0.4 -0.6 -0.7 -0.8 -1.2 -0.2 -0.6 0.2 -0.9 -0.5 -0.4 -0.3
-3.5 -2.4 -3.3 -4.9 -4.1 -3.9 -3.9 -3.5 -4.4 -4.7 -4.5 -4.2 -4.2 -4.1 -3.9 -2.0
-1.7 -2.5 -2.2 -3.1 -9.6 -2.3
60°N
30°N
0°
30°S
60°S
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). MARCH 2003
All observations
Values are plotted where greater than 10 obs are present


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.6 7.3 6.4 5.6 9.3 8.2 8.7 8.7 9.3 7.9 6.4
8.1 9.8 6.5 6.6 6.8 7.0 7.4 5.8 5.3 4.9 6.1 7.1 7.5 7.6 10.8 9.9 8.5 9.0 8.6 8.2 9.1 9.0 7.3 8.2 8.1 9.5 9.2 12.2 6.5 5.7
6.4 6.6 6.5 6.5 6.1 6.5 6.2 5.6 5.0 5.7 6.3 7.3 7.4 9.6 9.3 9.3 7.4 7.3 7.1 7.1 8.7 7.1 7.4 7.4 8.5 8.0 7.5 8.1 7.6 8.6 8.7 10.0 10.8 8.8 8.7 6.4
7.1 6.6 6.3 5.4 4.9 4.8 5.6 5.9 6.7 7.5 7.2 7.0 7.5 8.1 7.6 7.0 6.2 6.1 6.9 7.8 8.5 10.0 11.5 10.8 9.2 9.6 8.8 9.6 11.6 11.6 8.9 8.4 9.6 9.6 9.5 7.6
5.6 5.7 5.3 4.9 5.2 6.6 6.5 7.4 7.0 5.8 5.6 5.5 7.3 6.8 6.6 5.9 7.4 10.5 10.7 10.8 10.7 11.0 12.0 11.5 9.1 9.0 11.7 11.1 12.8 11.0 8.7 10.0 8.5 9.3 8.7 7.2
5.6 6.6 7.5 6.8 6.6 6.4 5.7 5.7 5.2 5.1 5.6 6.2 8.0 7.8 7.4 7.6 8.2 9.0 9.3 9.9 10.1 9.6 9.7 8.1 6.9 8.2 8.1 7.1 6.4 6.2 6.1 6.0 7.5 6.5 6.1 7.0
6.2 6.1 7.1 6.9 6.9 6.9 6.2 6.5 5.8 5.7 5.5 5.8 6.7 7.3 7.6 9.2 8.6 8.5 8.7 9.1 8.8 7.6 6.7 6.0 7.0 6.5 7.0 6.2 6.5 6.2 6.4 5.7 5.7 5.9 5.7 6.1
5.4 5.6 5.8 6.1 6.8 7.5 9.0 6.1 5.9 4.6 5.4 5.5 6.3 6.8 6.3 7.2 7.3 8.4 7.9 7.7 6.9 6.9 6.9 6.5 6.8 7.2 7.2 6.5 6.5 7.0 6.6 5.9 5.5 5.7 5.7 5.7
5.6 5.5 5.0 5.1 5.2 4.7 5.1 6.0 5.3 5.3 5.0 5.2 5.4 6.1 5.9 5.7 7.8 9.8 8.1 6.1 6.1 6.4 6.4 6.3 6.8 7.0 7.2 6.5 7.1 7.6 7.0 7.5 7.0 6.9 6.4 5.9
5.9 5.9 5.9 5.6 5.1 5.1 5.4 5.1 4.8 4.6 4.9 6.2 6.6 6.9 5.8 5.6 6.6 6.8 10.7 10.1 8.2 6.3 5.9 6.0 7.9 8.6 9.3 9.6 8.9 7.8 7.7 7.1 9.5 8.4 8.5 6.6
6.1 6.4 6.5 6.2 6.7 6.5 6.1 6.4 5.7 5.5 4.9 6.2 6.4 7.5 7.7 7.6 7.6 8.5 8.6 10.3 10.6 8.7 7.2 7.4 7.1 7.9 8.2 8.5 9.2 8.9 6.9 7.5 8.9 7.0 7.5 6.3
5.2 7.4 6.5 5.7 6.1 8.0 7.5 7.4 6.5 5.4 5.1 6.1 5.8 8.7 10.5 11.3 11.6 11.3 11.5 10.7 10.6 10.4 9.2 9.1 8.9 7.8 7.5 8.0 8.4 8.0 7.7 7.9 7.8 7.2 6.9 5.4
10.4 13.8 12.2 14.8 13.8 15.9 13.3 11.4 13.0 12.7 12.9 12.5 12.0 11.4 11.3 10.5
14.7 10.3 15.8 9.7 19.9 15.0

## MONITORING OF SATELLITE TEMPERATURES

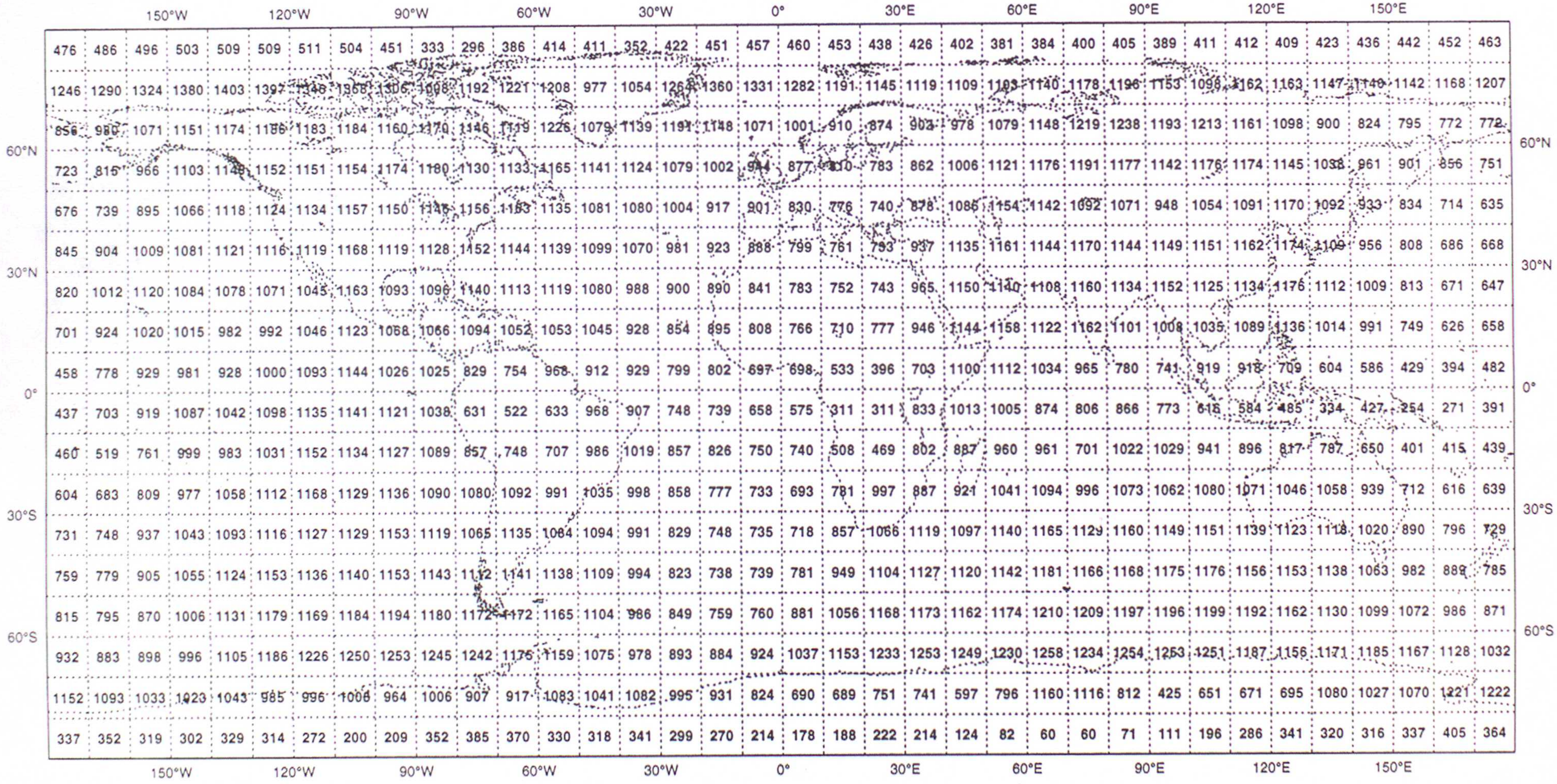
## MONITORING CENTRE: BRACKNELL

## MONTH: March 2003

**Monitoring procedures**

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from NOAA-15, NOAA-16 and NOAA-17. |
| **Standard of comparison** | :Background field from UKMO global model. |
| **Selection Criteria** | :All soundings. |
| **Data Extracted** | :Sounding channels (and approximate weighting function peaks, hPa)<br>HIRS8 (Surface)<br>HIRS15 (700)<br>HIRS11 (500-700)<br>HIRS4 (400)<br>AMSUA5 (700)<br>AMSUA7 (300)<br>AMSUA9 (100) |
| | :Mean and standard deviation observation-minus-background brightness temperature differences |

Figure 25. ATOVS mean daily count. MARCH 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 593797



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 476 | 486 | 496 | 503 | 509 | 509 | 511 | 504 | 451 | 333 | 296 | 386 | 414 | 411 | 352 | 422 | 451 | 457 | 460 | 453 | 438 | 426 | 402 | 381 | 384 | 400 | 405 | 389 | 411 | 412 | 409 | 423 | 436 | 442 | 452 | 463 |
| 1246 | 1290 | 1324 | 1380 | 1403 | 1397 | 1348 | 1368 | 1306 | 1098 | 1192 | 1221 | 1208 | 977 | 1054 | 1264 | 1360 | 1331 | 1282 | 1191 | 1145 | 1119 | 1109 | 1103 | 1140 | 1178 | 1196 | 1153 | 1098 | 1162 | 1163 | 1147 | 1140 | 1142 | 1168 | 1207 |
| 856 | 980 | 1071 | 1151 | 1174 | 1186 | 1183 | 1184 | 1160 | 1170 | 1146 | 1119 | 1226 | 1079 | 1139 | 1191 | 1148 | 1071 | 1001 | 910 | 874 | 903 | 978 | 1079 | 1148 | 1219 | 1238 | 1193 | 1213 | 1161 | 1098 | 900 | 824 | 795 | 772 | 772 |
| 723 | 815 | 966 | 1103 | 1148 | 1152 | 1151 | 1154 | 1174 | 1180 | 1130 | 1133 | 1165 | 1141 | 1124 | 1079 | 1002 | 944 | 877 | 810 | 783 | 862 | 1006 | 1121 | 1176 | 1191 | 1177 | 1142 | 1176 | 1174 | 1145 | 1038 | 961 | 901 | 856 | 751 |
| 676 | 739 | 895 | 1066 | 1118 | 1124 | 1134 | 1157 | 1150 | 1146 | 1156 | 1153 | 1135 | 1081 | 1080 | 1004 | 917 | 901 | 830 | 776 | 740 | 878 | 1086 | 1154 | 1142 | 1092 | 1071 | 948 | 1054 | 1091 | 1170 | 1092 | 933 | 834 | 714 | 635 |
| 845 | 904 | 1009 | 1081 | 1121 | 1116 | 1119 | 1168 | 1119 | 1128 | 1152 | 1144 | 1139 | 1099 | 1070 | 981 | 923 | 888 | 799 | 761 | 793 | 937 | 1135 | 1161 | 1144 | 1170 | 1144 | 1149 | 1151 | 1162 | 1174 | 1109 | 956 | 808 | 686 | 668 |
| 820 | 1012 | 1120 | 1084 | 1078 | 1071 | 1045 | 1163 | 1093 | 1096 | 1140 | 1113 | 1119 | 1080 | 988 | 900 | 890 | 841 | 783 | 752 | 743 | 965 | 1150 | 1140 | 1108 | 1160 | 1134 | 1152 | 1125 | 1134 | 1176 | 1112 | 1009 | 813 | 671 | 647 |
| 701 | 924 | 1020 | 1015 | 982 | 992 | 1046 | 1123 | 1068 | 1066 | 1094 | 1052 | 1053 | 1045 | 928 | 854 | 895 | 808 | 766 | 710 | 777 | 946 | 1144 | 1158 | 1122 | 1162 | 1101 | 1008 | 1035 | 1089 | 1136 | 1014 | 991 | 749 | 626 | 658 |
| 458 | 778 | 929 | 981 | 928 | 1000 | 1093 | 1144 | 1026 | 1025 | 829 | 754 | 968 | 912 | 929 | 799 | 802 | 697 | 698 | 533 | 396 | 703 | 1100 | 1112 | 1034 | 965 | 780 | 741 | 919 | 918 | 709 | 604 | 586 | 429 | 394 | 482 |
| 437 | 703 | 919 | 1087 | 1042 | 1098 | 1135 | 1141 | 1121 | 1038 | 631 | 522 | 633 | 968 | 907 | 748 | 739 | 658 | 575 | 311 | 311 | 833 | 1013 | 1005 | 874 | 806 | 866 | 773 | 616 | 584 | 485 | 334 | 427 | 254 | 271 | 391 |
| 460 | 519 | 761 | 999 | 983 | 1031 | 1152 | 1134 | 1127 | 1089 | 857 | 748 | 707 | 986 | 1019 | 857 | 826 | 750 | 740 | 508 | 469 | 802 | 887 | 960 | 961 | 701 | 1022 | 1029 | 941 | 896 | 817 | 787 | 650 | 401 | 415 | 439 |
| 604 | 683 | 809 | 977 | 1058 | 1112 | 1168 | 1129 | 1136 | 1090 | 1080 | 1092 | 991 | 1035 | 998 | 858 | 777 | 733 | 693 | 781 | 997 | 887 | 921 | 1041 | 1094 | 996 | 1073 | 1062 | 1080 | 1071 | 1046 | 1058 | 939 | 712 | 616 | 639 |
| 731 | 748 | 937 | 1043 | 1093 | 1116 | 1127 | 1129 | 1153 | 1119 | 1065 | 1135 | 1064 | 1094 | 991 | 829 | 748 | 735 | 718 | 857 | 1066 | 1119 | 1097 | 1140 | 1165 | 1129 | 1160 | 1149 | 1151 | 1139 | 1123 | 1118 | 1020 | 890 | 796 | 729 |
| 759 | 779 | 905 | 1055 | 1124 | 1153 | 1136 | 1140 | 1153 | 1143 | 1112 | 1141 | 1138 | 1109 | 994 | 823 | 738 | 739 | 781 | 949 | 1104 | 1127 | 1120 | 1142 | 1181 | 1166 | 1168 | 1175 | 1176 | 1156 | 1153 | 1138 | 1063 | 982 | 889 | 785 |
| 815 | 795 | 870 | 1006 | 1131 | 1179 | 1169 | 1184 | 1194 | 1180 | 1172 | 1172 | 1165 | 1104 | 986 | 849 | 759 | 760 | 881 | 1056 | 1168 | 1173 | 1162 | 1174 | 1210 | 1209 | 1197 | 1196 | 1199 | 1192 | 1162 | 1130 | 1099 | 1072 | 986 | 871 |
| 932 | 883 | 898 | 996 | 1105 | 1186 | 1226 | 1250 | 1253 | 1245 | 1242 | 1175 | 1159 | 1075 | 978 | 893 | 884 | 924 | 1037 | 1153 | 1233 | 1253 | 1249 | 1230 | 1258 | 1234 | 1254 | 1253 | 1251 | 1187 | 1156 | 1171 | 1185 | 1167 | 1128 | 1032 |
| 1152 | 1093 | 1033 | 1023 | 1043 | 985 | 996 | 1006 | 964 | 1006 | 907 | 917 | 1083 | 1041 | 1082 | 995 | 931 | 824 | 690 | 689 | 751 | 741 | 597 | 796 | 1160 | 1116 | 812 | 425 | 651 | 671 | 695 | 1080 | 1027 | 1070 | 1221 | 1222 |
| 337 | 352 | 319 | 302 | 329 | 314 | 272 | 200 | 209 | 352 | 385 | 370 | 330 | 318 | 341 | 299 | 270 | 214 | 178 | 188 | 222 | 214 | 124 | 82 | 60 | 60 | 71 | 111 | 196 | 286 | 341 | 320 | 316 | 337 | 405 | 364 |

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations

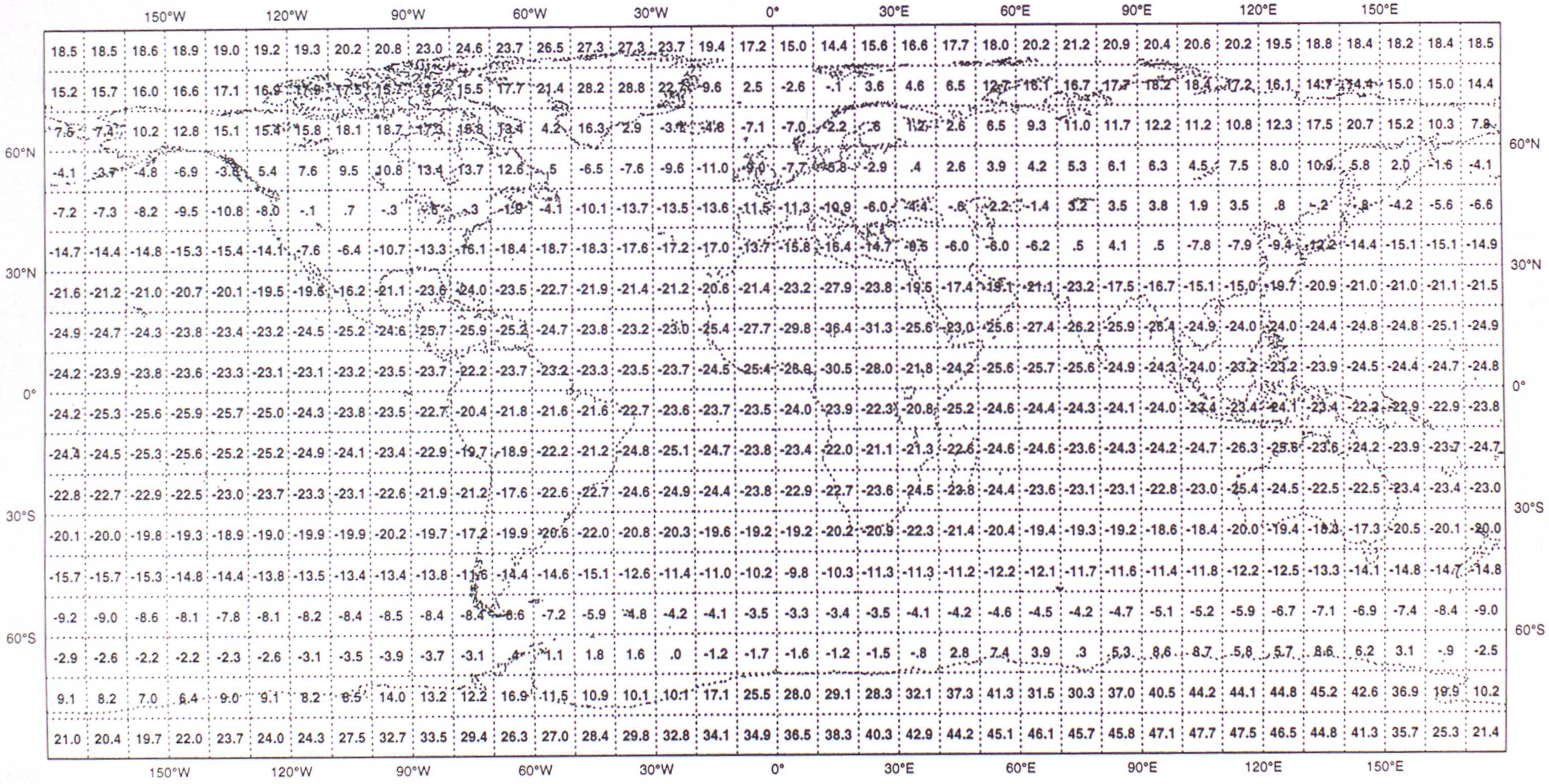
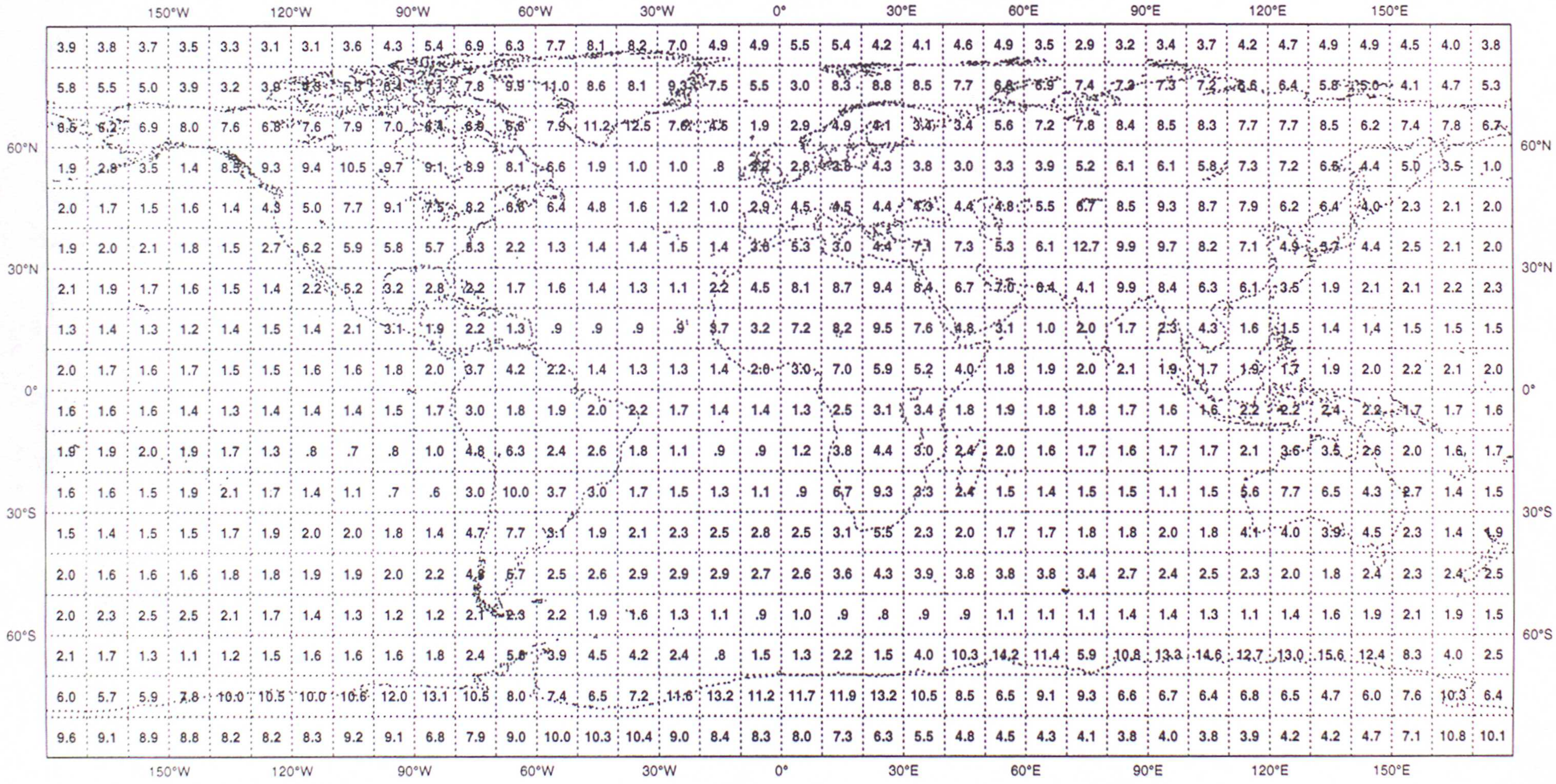

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
18.5 18.5 18.6 18.9 19.0 19.2 19.3 20.2 20.8 23.0 24.6 23.7 26.5 27.3 27.3 23.7 19.4 17.2 15.0 14.4 15.6 16.6 17.7 18.0 20.2 21.2 20.9 20.4 20.6 20.2 19.5 18.8 18.4 18.2 18.4 18.5
15.2 15.7 16.0 16.6 17.1 16.9 17.9 17.5 15.7 13.2 15.5 17.7 21.4 28.2 28.8 22.7 9.6 2.5 -2.6 -.1 3.6 4.6 6.5 12.7 16.1 16.7 17.7 18.2 18.4 17.2 16.1 14.7 14.4 15.0 15.0 14.4
7.6 7.4 10.2 12.8 15.1 15.4 15.8 18.1 18.7 17.3 15.8 13.4 4.2 16.3 2.9 -3.1 -4.8 -7.1 -7.0 -2.2 .6 1.2 2.6 6.5 9.3 11.0 11.7 12.2 11.2 10.8 12.3 17.5 20.7 15.2 10.3 7.8
-4.1 -3.7 -4.8 -6.9 -3.8 5.4 7.6 9.5 10.8 13.4 13.7 12.6 .5 -6.5 -7.6 -9.6 -11.0 -9.0 -7.7 -5.8 -2.9 .4 2.6 3.9 4.2 5.3 6.1 6.3 4.5 7.5 8.0 10.9 5.8 2.0 -1.6 -4.1
-7.2 -7.3 -8.2 -9.5 -10.8 -8.0 -.1 .7 -.3 -.6 -.3 -1.9 -4.1 -10.1 -13.7 -13.5 -13.6 -11.5 -11.3 -10.9 -6.0 -4.4 -.6 -2.2 -1.4 3.2 3.5 3.8 1.9 3.5 .8 -.2 -.8 -4.2 -5.6 -6.6
-14.7 -14.4 -14.8 -15.3 -15.4 -14.1 -7.6 -6.4 -10.7 -13.3 -16.1 -18.4 -18.7 -18.3 -17.6 -17.2 -17.0 -13.7 -15.8 -16.4 -14.7 -8.5 -6.0 -6.0 -6.2 .5 4.1 .5 -7.8 -7.9 -9.4 -12.2 -14.4 -15.1 -15.1 -14.9
-21.6 -21.2 -21.0 -20.7 -20.1 -19.5 -19.6 -16.2 -21.1 -23.6 -24.0 -23.5 -22.7 -21.9 -21.4 -21.2 -20.6 -21.4 -23.2 -27.9 -23.8 -19.5 -17.4 -19.1 -21.1 -23.2 -17.5 -16.7 -15.1 -15.0 -19.7 -20.9 -21.0 -21.0 -21.1 -21.5
-24.9 -24.7 -24.3 -23.8 -23.4 -23.2 -24.5 -25.2 -24.6 -25.7 -25.9 -25.2 -24.7 -23.8 -23.2 -23.0 -25.4 -27.7 -29.8 -36.4 -31.3 -25.6 -23.0 -25.6 -27.4 -26.2 -25.9 -26.4 -24.9 -24.0 -24.0 -24.4 -24.8 -24.8 -25.1 -24.9
-24.2 -23.9 -23.8 -23.6 -23.3 -23.1 -23.1 -23.2 -23.5 -23.7 -22.2 -23.7 -23.2 -23.3 -23.5 -23.7 -24.5 -25.4 -26.9 -30.5 -28.0 -21.8 -24.2 -25.6 -25.7 -25.6 -24.9 -24.3 -24.0 -23.2 -23.2 -23.9 -24.5 -24.4 -24.7 -24.8
-24.2 -25.3 -25.6 -25.9 -25.7 -25.0 -24.3 -23.8 -23.5 -22.7 -20.4 -21.8 -21.6 -21.6 -22.7 -23.6 -23.7 -23.5 -24.0 -23.9 -22.3 -20.8 -25.2 -24.6 -24.4 -24.3 -24.1 -24.0 -23.4 -23.4 -24.1 -23.4 -22.2 -22.9 -22.9 -23.8
-24.4 -24.5 -25.3 -25.6 -25.2 -25.2 -24.9 -24.1 -23.4 -22.9 -19.7 -18.9 -22.2 -21.2 -24.8 -25.1 -24.7 -23.8 -23.4 -22.0 -21.1 -21.3 -22.6 -24.6 -24.6 -23.6 -24.3 -24.2 -24.7 -26.3 -25.6 -23.6 -24.2 -23.9 -23.7 -24.7
-22.8 -22.7 -22.9 -22.5 -23.0 -23.7 -23.3 -23.1 -22.6 -21.9 -21.2 -17.6 -22.6 -22.7 -24.6 -24.9 -24.4 -23.8 -22.9 -22.7 -23.6 -24.5 -23.8 -24.4 -23.6 -23.1 -23.1 -22.8 -23.0 -25.4 -24.5 -22.5 -22.5 -23.4 -23.4 -23.0
-20.1 -20.0 -19.8 -19.3 -18.9 -19.0 -19.9 -19.9 -20.2 -19.7 -17.2 -19.9 -20.6 -22.0 -20.8 -20.3 -19.6 -19.2 -19.2 -20.2 -20.9 -22.3 -21.4 -20.4 -19.4 -19.3 -19.2 -18.6 -18.4 -20.0 -19.4 -18.3 -17.3 -20.5 -20.1 -20.0
-15.7 -15.7 -15.3 -14.8 -14.4 -13.8 -13.5 -13.4 -13.4 -13.8 -11.6 -14.4 -14.6 -15.1 -12.6 -11.4 -11.0 -10.2 -9.8 -10.3 -11.3 -11.3 -11.2 -12.2 -12.1 -11.7 -11.6 -11.4 -11.8 -12.2 -12.5 -13.3 -14.1 -14.8 -14.7 -14.8
-9.2 -9.0 -8.6 -8.1 -7.8 -8.1 -8.2 -8.4 -8.5 -8.4 -8.4 -8.6 -7.2 -5.9 -4.8 -4.2 -4.1 -3.5 -3.3 -3.4 -3.5 -4.1 -4.2 -4.6 -4.5 -4.2 -4.7 -5.1 -5.2 -5.9 -6.7 -7.1 -6.9 -7.4 -8.4 -9.0
-2.9 -2.6 -2.2 -2.2 -2.3 -2.6 -3.1 -3.5 -3.9 -3.7 -3.1 .4 1.1 1.8 1.6 .0 -1.2 -1.7 -1.6 -1.2 -1.5 -.8 2.8 7.4 3.9 .3 5.3 8.6 8.7 5.8 5.7 8.6 6.2 3.1 -.9 -2.5
9.1 8.2 7.0 6.4 9.0 9.1 8.2 8.5 14.0 13.2 12.2 16.9 11.5 10.9 10.1 10.1 17.1 25.5 28.0 29.1 28.3 32.1 37.3 41.3 31.5 30.3 37.0 40.5 44.2 44.1 44.8 45.2 42.6 36.9 19.9 10.2
21.0 20.4 19.7 22.0 23.7 24.0 24.3 27.5 32.7 33.5 29.4 26.3 27.0 28.4 29.8 32.8 34.1 34.9 36.5 38.3 40.3 42.9 44.2 45.1 46.1 45.7 45.8 47.1 47.7 47.5 46.5 44.8 41.3 35.7 25.3 21.4

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



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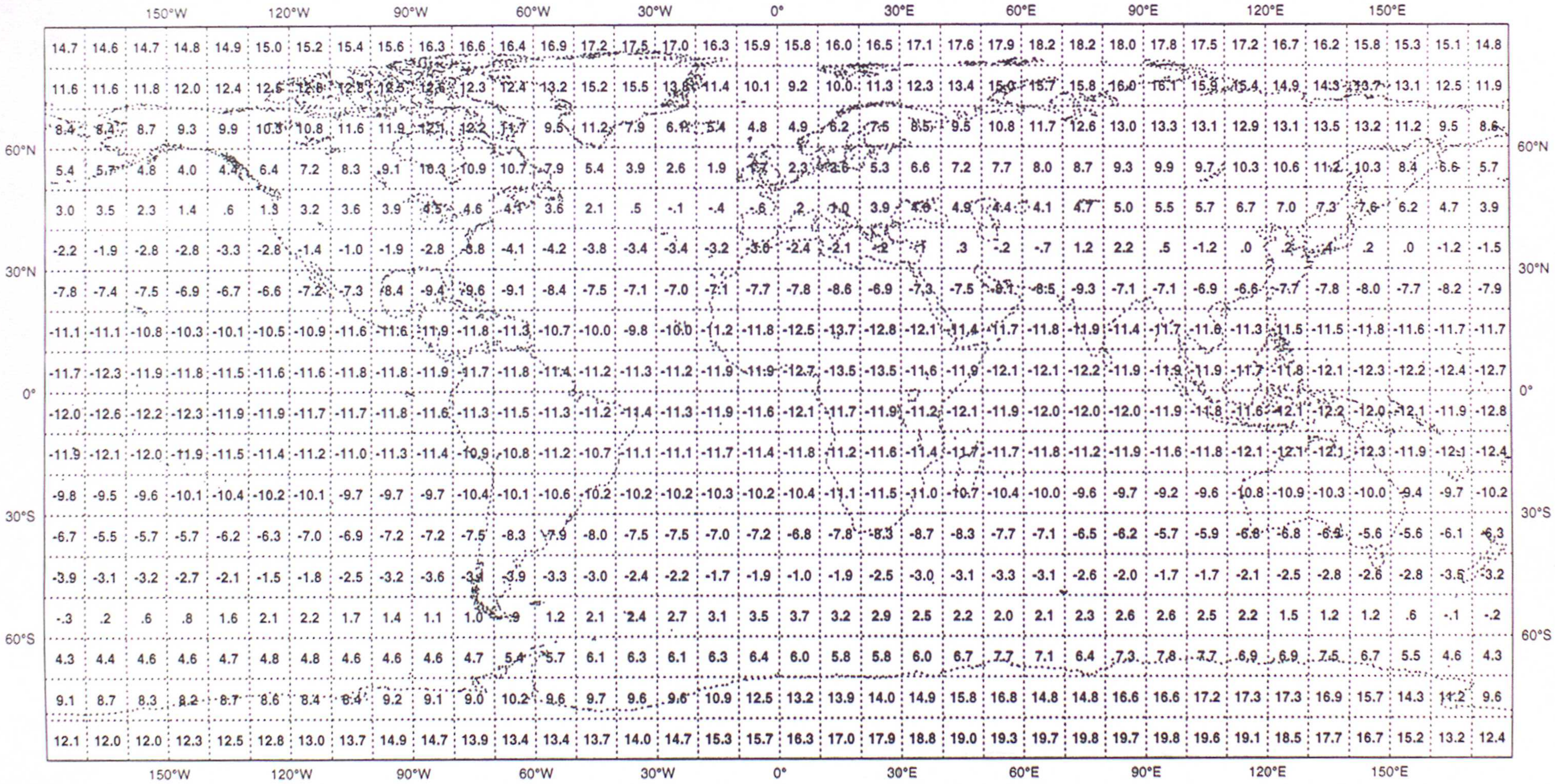
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.9 | 3.8 | 3.7 | 3.5 | 3.3 | 3.1 | 3.1 | 3.6 | 4.3 | 5.4 | 6.9 | 6.3 | 7.7 | 8.1 | 8.2 | 7.0 | 4.9 | 4.9 | 5.5 | 5.4 | 4.2 | 4.1 | 4.6 | 4.9 | 3.5 | 2.9 | 3.2 | 3.4 | 3.7 | 4.2 | 4.7 | 4.9 | 4.9 | 4.5 | 4.0 | 3.8 |
| 5.8 | 5.5 | 5.0 | 3.9 | 3.2 | 3.8 | 9.8 | 5.3 | 6.4 | 7.1 | 7.8 | 9.9 | 11.0 | 8.6 | 8.1 | 9.3 | 7.5 | 5.5 | 3.0 | 8.3 | 8.8 | 8.5 | 7.7 | 6.8 | 6.9 | 7.4 | 7.3 | 7.3 | 7.2 | 6.6 | 6.4 | 5.8 | 5.0 | 4.1 | 4.7 | 5.3 |
| 6.5 | 6.2 | 6.9 | 8.0 | 7.6 | 6.8 | 7.6 | 7.9 | 7.0 | 6.4 | 6.8 | 5.6 | 7.9 | 11.2 | 12.5 | 7.6 | 4.5 | 1.9 | 2.9 | 4.9 | 4.1 | 3.4 | 3.4 | 5.6 | 7.2 | 7.8 | 8.4 | 8.5 | 8.3 | 7.7 | 7.7 | 8.5 | 6.2 | 7.4 | 7.8 | 6.7 |
| 1.9 | 2.8 | 3.5 | 1.4 | 8.5 | 9.3 | 9.4 | 10.5 | 9.7 | 9.1 | 8.9 | 8.1 | 6.6 | 1.9 | 1.0 | 1.0 | .8 | 2.2 | 2.8 | 2.8 | 4.3 | 3.8 | 3.0 | 3.3 | 3.9 | 5.2 | 6.1 | 6.1 | 5.8 | 7.3 | 7.2 | 6.6 | 4.4 | 5.0 | 3.5 | 1.0 |
| 2.0 | 1.7 | 1.5 | 1.6 | 1.4 | 4.3 | 5.0 | 7.7 | 9.1 | 7.5 | 8.2 | 6.6 | 6.4 | 4.8 | 1.6 | 1.2 | 1.0 | 2.9 | 4.5 | 4.5 | 4.4 | 4.3 | 4.4 | 4.8 | 5.5 | 6.7 | 8.5 | 9.3 | 8.7 | 7.9 | 6.2 | 6.4 | 4.0 | 2.3 | 2.1 | 2.0 |
| 1.9 | 2.0 | 2.1 | 1.8 | 1.5 | 2.7 | 6.2 | 5.9 | 5.8 | 5.7 | 5.3 | 2.2 | 1.3 | 1.4 | 1.4 | 1.5 | 1.4 | 3.6 | 5.3 | 3.0 | 4.4 | 7.1 | 7.3 | 5.3 | 6.1 | 12.7 | 9.9 | 9.7 | 8.2 | 7.1 | 4.9 | 5.7 | 4.4 | 2.5 | 2.1 | 2.0 |
| 2.1 | 1.9 | 1.7 | 1.6 | 1.5 | 1.4 | 2.2 | 5.2 | 3.2 | 2.8 | 2.2 | 1.7 | 1.6 | 1.4 | 1.3 | 1.1 | 2.2 | 4.5 | 8.1 | 8.7 | 9.4 | 8.4 | 6.7 | 7.0 | 6.4 | 4.1 | 9.9 | 8.4 | 6.3 | 6.1 | 3.5 | 1.9 | 2.1 | 2.1 | 2.2 | 2.3 |
| 1.3 | 1.4 | 1.3 | 1.2 | 1.4 | 1.5 | 1.4 | 2.1 | 3.1 | 1.9 | 2.2 | 1.3 | .9 | .9 | .9 | .9 | 3.7 | 3.2 | 7.2 | 8.2 | 9.5 | 7.6 | 4.8 | 3.1 | 1.0 | 2.0 | 1.7 | 2.3 | 4.3 | 1.6 | 1.5 | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 |
| 2.0 | 1.7 | 1.6 | 1.7 | 1.5 | 1.5 | 1.6 | 1.6 | 1.8 | 2.0 | 3.7 | 4.2 | 2.2 | 1.4 | 1.3 | 1.3 | 1.4 | 2.0 | 3.0 | 7.0 | 5.9 | 5.2 | 4.0 | 1.8 | 1.9 | 2.0 | 2.1 | 1.9 | 1.7 | 1.9 | 1.7 | 1.9 | 2.0 | 2.2 | 2.1 | 2.0 |
| 1.6 | 1.6 | 1.6 | 1.4 | 1.3 | 1.4 | 1.4 | 1.4 | 1.5 | 1.7 | 3.0 | 1.8 | 1.9 | 2.0 | 2.2 | 1.7 | 1.4 | 1.4 | 1.3 | 2.5 | 3.1 | 3.4 | 1.8 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 2.2 | 2.2 | 2.4 | 2.2 | 1.7 | 1.7 | 1.6 |
| 1.9 | 1.9 | 2.0 | 1.9 | 1.7 | 1.3 | .8 | .7 | .8 | 1.0 | 4.8 | 6.3 | 2.4 | 2.6 | 1.8 | 1.1 | .9 | .9 | 1.2 | 3.8 | 4.4 | 3.0 | 2.4 | 2.0 | 1.6 | 1.7 | 1.6 | 1.7 | 1.7 | 2.1 | 3.6 | 3.5 | 2.6 | 2.0 | 1.6 | 1.7 |
| 1.6 | 1.6 | 1.5 | 1.9 | 2.1 | 1.7 | 1.4 | 1.1 | .7 | .6 | 3.0 | 10.0 | 3.7 | 3.0 | 1.7 | 1.5 | 1.3 | 1.1 | .9 | 6.7 | 9.3 | 3.3 | 2.4 | 1.5 | 1.4 | 1.5 | 1.5 | 1.1 | 1.5 | 5.6 | 7.7 | 6.5 | 4.3 | 2.7 | 1.4 | 1.5 |
| 1.5 | 1.4 | 1.5 | 1.5 | 1.7 | 1.9 | 2.0 | 2.0 | 1.8 | 1.4 | 4.7 | 7.7 | 3.1 | 1.9 | 2.1 | 2.3 | 2.5 | 2.8 | 2.5 | 3.1 | 5.5 | 2.3 | 2.0 | 1.7 | 1.7 | 1.8 | 1.8 | 2.0 | 1.8 | 4.1 | 4.0 | 3.9 | 4.5 | 2.3 | 1.4 | 1.9 |
| 2.0 | 1.6 | 1.6 | 1.6 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.2 | 4.8 | 5.7 | 2.5 | 2.6 | 2.9 | 2.9 | 2.9 | 2.7 | 2.6 | 3.6 | 4.3 | 3.9 | 3.8 | 3.8 | 3.8 | 3.4 | 2.7 | 2.4 | 2.5 | 2.3 | 2.0 | 1.8 | 2.4 | 2.3 | 2.4 | 2.5 |
| 2.0 | 2.3 | 2.5 | 2.5 | 2.1 | 1.7 | 1.4 | 1.3 | 1.2 | 1.2 | 2.1 | 2.3 | 2.2 | 1.9 | 1.6 | 1.3 | 1.1 | .9 | 1.0 | .9 | .8 | .9 | .9 | 1.1 | 1.1 | 1.1 | 1.4 | 1.4 | 1.3 | 1.1 | 1.4 | 1.6 | 1.9 | 2.1 | 1.9 | 1.5 |
| 2.1 | 1.7 | 1.3 | 1.1 | 1.2 | 1.5 | 1.6 | 1.6 | 1.6 | 1.8 | 2.4 | 5.8 | 3.9 | 4.5 | 4.2 | 2.4 | .8 | 1.5 | 1.3 | 2.2 | 1.5 | 4.0 | 10.3 | 14.2 | 11.4 | 5.9 | 10.8 | 13.3 | 14.6 | 12.7 | 13.0 | 15.6 | 12.4 | 8.3 | 4.0 | 2.5 |
| 6.0 | 5.7 | 5.9 | 7.8 | 10.0 | 10.5 | 10.0 | 10.6 | 12.0 | 13.1 | 10.5 | 8.0 | 7.4 | 6.5 | 7.2 | 11.6 | 13.2 | 11.2 | 11.7 | 11.9 | 13.2 | 10.5 | 8.5 | 6.5 | 9.1 | 9.3 | 6.6 | 6.7 | 6.4 | 6.8 | 6.5 | 4.7 | 6.0 | 7.6 | 10.3 | 6.4 |
| 9.6 | 9.1 | 8.9 | 8.8 | 8.2 | 8.2 | 8.3 | 9.2 | 9.1 | 6.8 | 7.9 | 9.0 | 10.0 | 10.3 | 10.4 | 9.0 | 8.4 | 8.3 | 8.0 | 7.3 | 6.3 | 5.5 | 4.8 | 4.5 | 4.3 | 4.1 | 3.8 | 4.0 | 3.8 | 3.9 | 4.2 | 4.2 | 4.7 | 7.1 | 10.8 | 10.1 |

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



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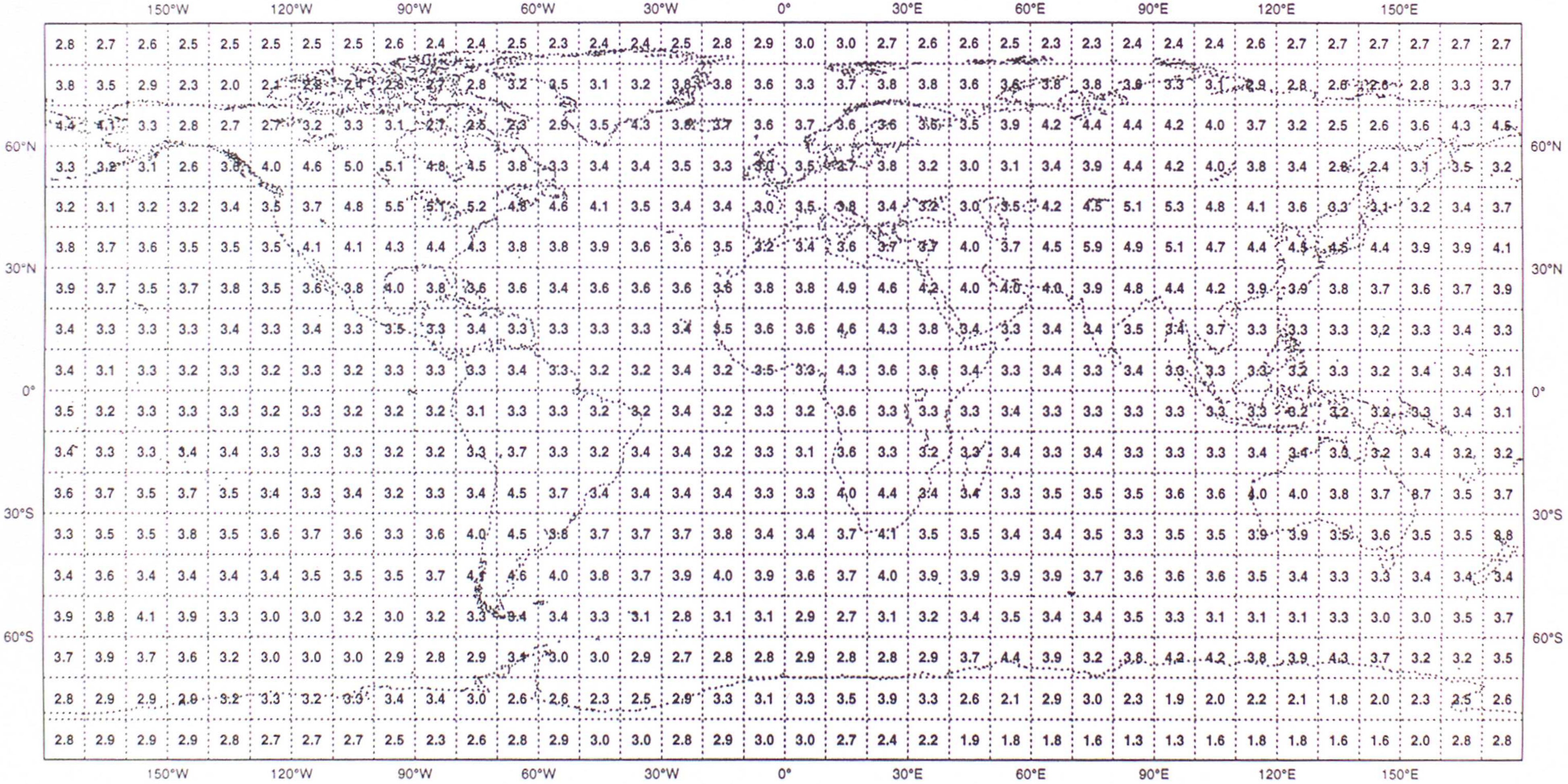
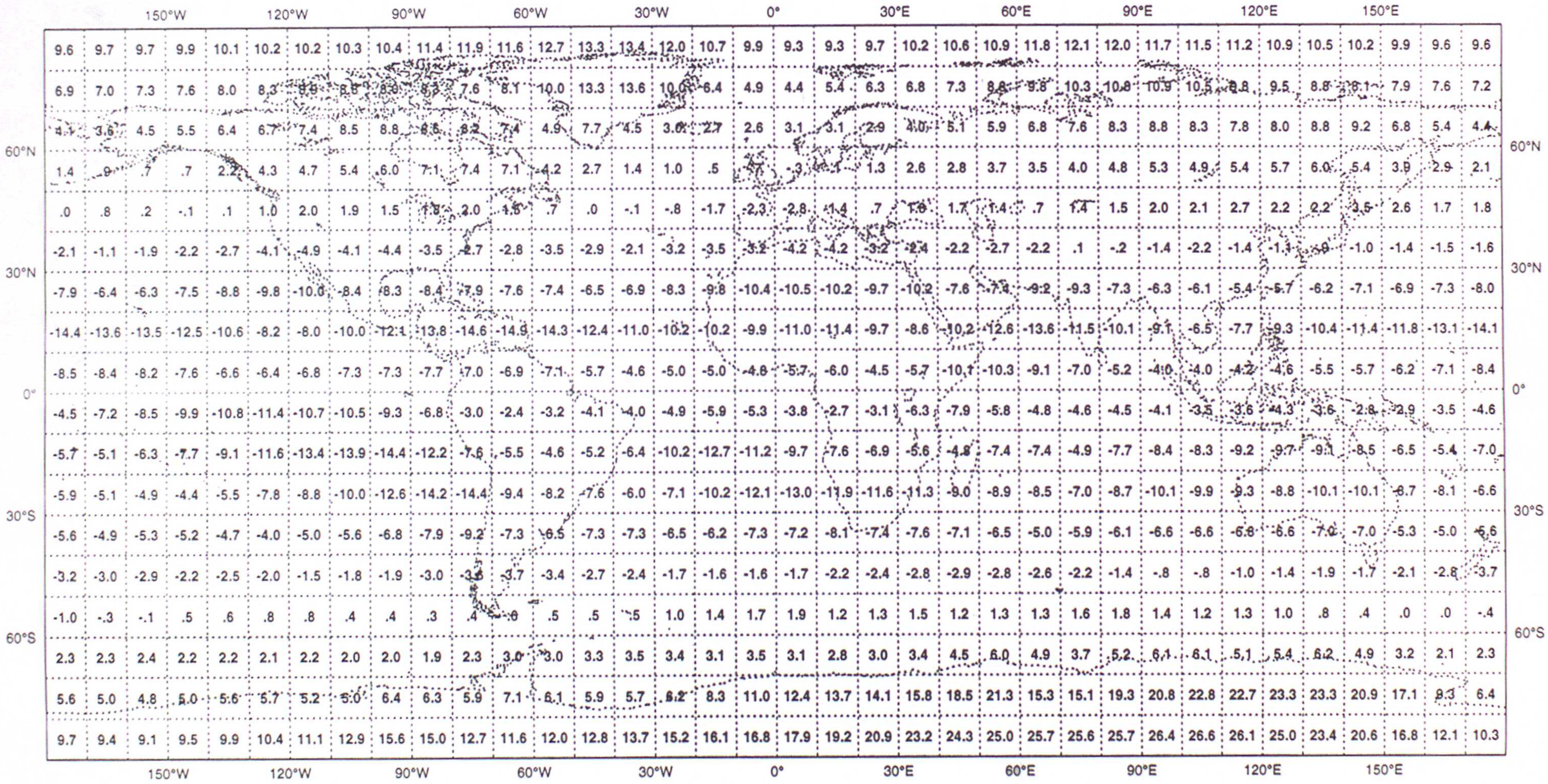
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.7 | 14.6 | 14.7 | 14.8 | 14.9 | 15.0 | 15.2 | 15.4 | 15.6 | 16.3 | 16.6 | 16.4 | 16.9 | 17.2 | 17.5 | 17.0 | 16.3 | 15.9 | 15.8 | 16.0 | 16.5 | 17.1 | 17.6 | 17.9 | 18.2 | 18.2 | 18.0 | 17.8 | 17.5 | 17.2 | 16.7 | 16.2 | 15.8 | 15.3 | 15.1 | 14.8 |
| 11.6 | 11.6 | 11.8 | 12.0 | 12.4 | 12.5 | 12.8 | 12.8 | 12.5 | 12.6 | 12.3 | 12.4 | 13.2 | 15.2 | 15.5 | 13.6 | 11.4 | 10.1 | 9.2 | 10.0 | 11.3 | 12.3 | 13.4 | 15.0 | 15.7 | 15.8 | 16.0 | 16.1 | 15.9 | 15.4 | 14.9 | 14.3 | 13.7 | 13.1 | 12.5 | 11.9 |
| 8.4 | 8.4 | 8.7 | 9.3 | 9.9 | 10.3 | 10.8 | 11.6 | 11.9 | 12.1 | 12.2 | 11.7 | 9.5 | 11.2 | 7.9 | 6.1 | 5.4 | 4.8 | 4.9 | 6.2 | 7.5 | 8.5 | 9.5 | 10.8 | 11.7 | 12.6 | 13.0 | 13.3 | 13.1 | 12.9 | 13.1 | 13.5 | 13.2 | 11.2 | 9.5 | 8.6 |
| 5.4 | 5.7 | 4.8 | 4.0 | 4.4 | 6.4 | 7.2 | 8.3 | 9.1 | 10.3 | 10.9 | 10.7 | 7.9 | 5.4 | 3.9 | 2.6 | 1.9 | 1.7 | 2.3 | 2.6 | 5.3 | 6.6 | 7.2 | 7.7 | 8.0 | 8.7 | 9.3 | 9.9 | 9.7 | 10.3 | 10.6 | 11.2 | 10.3 | 8.4 | 6.6 | 5.7 |
| 3.0 | 3.5 | 2.3 | 1.4 | .6 | 1.3 | 3.2 | 3.6 | 3.9 | 4.5 | 4.6 | 4.1 | 3.6 | 2.1 | .5 | -.1 | -.4 | -.6 | .2 | 1.0 | 3.9 | 4.6 | 4.9 | 4.4 | 4.1 | 4.7 | 5.0 | 5.5 | 5.7 | 6.7 | 7.0 | 7.3 | 7.6 | 6.2 | 4.7 | 3.9 |
| -2.2 | -1.9 | -2.8 | -2.8 | -3.3 | -2.8 | -1.4 | -1.0 | -1.9 | -2.8 | -3.8 | -4.1 | -4.2 | -3.8 | -3.4 | -3.4 | -3.2 | -3.6 | -2.4 | -2.1 | -.2 | -.1 | .3 | -.2 | -.7 | 1.2 | 2.2 | .5 | -1.2 | .0 | .2 | .4 | .2 | .0 | -1.2 | -1.5 |
| -7.8 | -7.4 | -7.5 | -6.9 | -6.7 | -6.6 | -7.2 | -7.3 | -8.4 | -9.4 | -9.6 | -9.1 | -8.4 | -7.5 | -7.1 | -7.0 | -7.1 | -7.7 | -7.8 | -8.6 | -6.9 | -7.3 | -7.5 | -8.1 | -8.5 | -9.3 | -7.1 | -7.1 | -6.9 | -6.6 | -7.7 | -7.8 | -8.0 | -7.7 | -8.2 | -7.9 |
| -11.1 | -11.1 | -10.8 | -10.3 | -10.1 | -10.5 | -10.9 | -11.6 | -11.6 | -11.9 | -11.8 | -11.3 | -10.7 | -10.0 | -9.8 | -10.0 | -11.2 | -11.8 | -12.5 | -13.7 | -12.8 | -12.1 | -11.4 | -11.7 | -11.8 | -11.9 | -11.4 | -11.7 | -11.6 | -11.3 | -11.5 | -11.5 | -11.8 | -11.6 | -11.7 | -11.7 |
| -11.7 | -12.3 | -11.9 | -11.8 | -11.5 | -11.6 | -11.6 | -11.8 | -11.8 | -11.9 | -11.7 | -11.8 | -11.4 | -11.2 | -11.3 | -11.2 | -11.9 | -11.9 | -12.7 | -13.5 | -13.5 | -11.6 | -11.9 | -12.1 | -12.1 | -12.2 | -11.9 | -11.9 | -11.9 | -11.7 | -11.8 | -12.1 | -12.3 | -12.2 | -12.4 | -12.7 |
| -12.0 | -12.6 | -12.2 | -12.3 | -11.9 | -11.9 | -11.7 | -11.7 | -11.8 | -11.6 | -11.3 | -11.5 | -11.3 | -11.2 | -11.4 | -11.3 | -11.9 | -11.6 | -12.1 | -11.7 | -11.9 | -11.2 | -12.1 | -11.9 | -12.0 | -12.0 | -12.0 | -11.9 | -11.8 | -11.6 | -12.1 | -12.2 | -12.0 | -12.1 | -11.9 | -12.8 |
| -11.9 | -12.1 | -12.0 | -11.9 | -11.5 | -11.4 | -11.2 | -11.0 | -11.3 | -11.4 | -10.9 | -10.8 | -11.2 | -10.7 | -11.1 | -11.1 | -11.7 | -11.4 | -11.8 | -11.2 | -11.6 | -11.4 | -11.7 | -11.7 | -11.8 | -11.2 | -11.9 | -11.6 | -11.8 | -12.1 | -12.1 | -12.1 | -12.3 | -11.9 | -12.1 | -12.4 |
| -9.8 | -9.5 | -9.6 | -10.1 | -10.4 | -10.2 | -10.1 | -9.7 | -9.7 | -9.7 | -10.4 | -10.1 | -10.6 | -10.2 | -10.2 | -10.2 | -10.3 | -10.2 | -10.4 | -11.1 | -11.5 | -11.0 | -10.7 | -10.4 | -10.0 | -9.6 | -9.7 | -9.2 | -9.6 | -10.8 | -10.9 | -10.3 | -10.0 | -9.4 | -9.7 | -10.2 |
| -6.7 | -5.5 | -5.7 | -5.7 | -6.2 | -6.3 | -7.0 | -6.9 | -7.2 | -7.2 | -7.5 | -8.3 | -7.9 | -8.0 | -7.5 | -7.5 | -7.0 | -7.2 | -6.8 | -7.8 | -8.3 | -8.7 | -8.3 | -7.7 | -7.1 | -6.5 | -6.2 | -5.7 | -5.9 | -6.8 | -6.8 | -6.5 | -5.6 | -5.6 | -6.1 | -6.3 |
| -3.9 | -3.1 | -3.2 | -2.7 | -2.1 | -1.5 | -1.8 | -2.5 | -3.2 | -3.6 | -3.4 | -3.9 | -3.3 | -3.0 | -2.4 | -2.2 | -1.7 | -1.9 | -1.0 | -1.9 | -2.5 | -3.0 | -3.1 | -3.3 | -3.1 | -2.6 | -2.0 | -1.7 | -1.7 | -2.1 | -2.5 | -2.8 | -2.6 | -2.8 | -3.5 | -3.2 |
| -.3 | .2 | .6 | .8 | 1.6 | 2.1 | 2.2 | 1.7 | 1.4 | 1.1 | 1.0 | .9 | 1.2 | 2.1 | 2.4 | 2.7 | 3.1 | 3.5 | 3.7 | 3.2 | 2.9 | 2.5 | 2.2 | 2.0 | 2.1 | 2.3 | 2.6 | 2.6 | 2.5 | 2.2 | 1.5 | 1.2 | 1.2 | .6 | -.1 | -.2 |
| 4.3 | 4.4 | 4.6 | 4.6 | 4.7 | 4.8 | 4.8 | 4.6 | 4.6 | 4.6 | 4.7 | 5.4 | 5.7 | 6.1 | 6.3 | 6.1 | 6.3 | 6.4 | 6.0 | 5.8 | 5.8 | 6.0 | 6.7 | 7.7 | 7.1 | 6.4 | 7.3 | 7.8 | 7.7 | 6.9 | 6.9 | 7.5 | 6.7 | 5.5 | 4.6 | 4.3 |
| 9.1 | 8.7 | 8.3 | 8.2 | 8.7 | 8.6 | 8.4 | 8.4 | 9.2 | 9.1 | 9.0 | 10.2 | 9.6 | 9.7 | 9.6 | 9.6 | 10.9 | 12.5 | 13.2 | 13.9 | 14.0 | 14.9 | 15.8 | 16.8 | 14.8 | 14.8 | 16.6 | 16.6 | 17.2 | 17.3 | 17.3 | 16.9 | 15.7 | 14.3 | 11.2 | 9.6 |
| 12.1 | 12.0 | 12.0 | 12.3 | 12.5 | 12.8 | 13.0 | 13.7 | 14.9 | 14.7 | 13.9 | 13.4 | 13.4 | 13.7 | 14.0 | 14.7 | 15.3 | 15.7 | 16.3 | 17.0 | 17.9 | 18.8 | 19.0 | 19.3 | 19.7 | 19.8 | 19.7 | 19.8 | 19.6 | 19.1 | 18.5 | 17.7 | 16.7 | 15.2 | 13.2 | 12.4 |

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.4 | 2.4 | 2.5 | 2.3 | 2.4 | 2.4 | 2.5 | 2.8 | 2.9 | 3.0 | 3.0 | 2.7 | 2.6 | 2.6 | 2.5 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| 3.8 | 3.5 | 2.9 | 2.3 | 2.0 | 2.1 | 2.8 | 2.4 | 2.6 | 2.7 | 2.8 | 3.2 | 3.5 | 3.1 | 3.2 | 3.8 | 3.8 | 3.6 | 3.3 | 3.7 | 3.8 | 3.8 | 3.6 | 3.6 | 3.8 | 3.8 | 3.9 | 3.3 | 3.1 | 2.9 | 2.8 | 2.6 | 2.6 | 2.8 | 3.3 | 3.7 |
| 4.4 | 4.1 | 3.3 | 2.8 | 2.7 | 2.7 | 3.2 | 3.3 | 3.1 | 2.7 | 2.5 | 2.3 | 2.9 | 3.5 | 4.3 | 3.8 | 3.7 | 3.6 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.9 | 4.2 | 4.4 | 4.4 | 4.2 | 4.0 | 3.7 | 3.2 | 2.5 | 2.6 | 3.6 | 4.3 | 4.5 |
| 3.3 | 3.2 | 3.1 | 2.6 | 3.8 | 4.0 | 4.6 | 5.0 | 5.1 | 4.8 | 4.5 | 3.8 | 3.3 | 3.4 | 3.4 | 3.5 | 3.3 | 3.0 | 3.5 | 2.7 | 3.8 | 3.2 | 3.0 | 3.1 | 3.4 | 3.9 | 4.4 | 4.2 | 4.0 | 3.8 | 3.4 | 2.8 | 2.4 | 3.1 | 3.5 | 3.2 |
| 3.2 | 3.1 | 3.2 | 3.2 | 3.4 | 3.5 | 3.7 | 4.8 | 5.5 | 5.1 | 5.2 | 4.8 | 4.6 | 4.1 | 3.5 | 3.4 | 3.4 | 3.0 | 3.5 | 3.8 | 3.4 | 3.2 | 3.0 | 3.5 | 4.2 | 4.5 | 5.1 | 5.3 | 4.8 | 4.1 | 3.6 | 3.3 | 3.1 | 3.2 | 3.4 | 3.7 |
| 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.5 | 4.1 | 4.1 | 4.3 | 4.4 | 4.3 | 3.8 | 3.8 | 3.9 | 3.6 | 3.6 | 3.5 | 3.2 | 3.4 | 3.6 | 3.7 | 3.7 | 4.0 | 3.7 | 4.5 | 5.9 | 4.9 | 5.1 | 4.7 | 4.4 | 4.5 | 4.5 | 4.4 | 3.9 | 3.9 | 4.1 |
| 3.9 | 3.7 | 3.5 | 3.7 | 3.8 | 3.5 | 3.6 | 3.8 | 4.0 | 3.8 | 3.6 | 3.6 | 3.4 | 3.6 | 3.6 | 3.6 | 3.6 | 3.8 | 3.8 | 4.9 | 4.6 | 4.2 | 4.0 | 4.0 | 4.0 | 3.9 | 4.8 | 4.4 | 4.2 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.7 | 3.9 |
| 3.4 | 3.3 | 3.3 | 3.3 | 3.4 | 3.3 | 3.4 | 3.3 | 3.5 | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 | 3.5 | 3.6 | 3.6 | 4.6 | 4.3 | 3.8 | 3.4 | 3.3 | 3.4 | 3.4 | 3.5 | 3.4 | 3.7 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.4 | 3.3 |
| 3.4 | 3.1 | 3.3 | 3.2 | 3.3 | 3.2 | 3.3 | 3.2 | 3.3 | 3.3 | 3.3 | 3.4 | 3.3 | 3.2 | 3.2 | 3.4 | 3.2 | 3.5 | 3.3 | 4.3 | 3.6 | 3.6 | 3.4 | 3.3 | 3.4 | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.2 | 3.4 | 3.4 | 3.1 |
| 3.5 | 3.2 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.3 | 3.3 | 3.2 | 3.2 | 3.4 | 3.2 | 3.3 | 3.2 | 3.6 | 3.3 | 3.3 | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.3 | 3.4 | 3.1 |
| 3.4 | 3.3 | 3.3 | 3.4 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.2 | 3.3 | 3.7 | 3.3 | 3.2 | 3.4 | 3.4 | 3.2 | 3.3 | 3.1 | 3.6 | 3.3 | 3.2 | 3.3 | 3.4 | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.4 | 3.4 | 3.3 | 3.2 | 3.4 | 3.2 | 3.2 |
| 3.6 | 3.7 | 3.5 | 3.7 | 3.5 | 3.4 | 3.3 | 3.4 | 3.2 | 3.3 | 3.4 | 4.5 | 3.7 | 3.4 | 3.4 | 3.4 | 3.4 | 3.3 | 3.3 | 4.0 | 4.4 | 3.4 | 3.4 | 3.3 | 3.5 | 3.5 | 3.5 | 3.6 | 3.6 | 4.0 | 4.0 | 3.8 | 3.7 | 3.7 | 3.5 | 3.7 |
| 3.3 | 3.5 | 3.5 | 3.8 | 3.5 | 3.6 | 3.7 | 3.6 | 3.3 | 3.6 | 4.0 | 4.5 | 3.8 | 3.7 | 3.7 | 3.7 | 3.8 | 3.4 | 3.4 | 3.7 | 4.1 | 3.5 | 3.5 | 3.4 | 3.4 | 3.5 | 3.3 | 3.5 | 3.5 | 3.9 | 3.9 | 3.5 | 3.6 | 3.5 | 3.5 | 3.8 |
| 3.4 | 3.6 | 3.4 | 3.4 | 3.4 | 3.4 | 3.5 | 3.5 | 3.5 | 3.7 | 4.1 | 4.6 | 4.0 | 3.8 | 3.7 | 3.9 | 4.0 | 3.9 | 3.6 | 3.7 | 4.0 | 3.9 | 3.9 | 3.9 | 3.9 | 3.7 | 3.6 | 3.6 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.4 | 3.4 | 3.4 |
| 3.9 | 3.8 | 4.1 | 3.9 | 3.3 | 3.0 | 3.0 | 3.2 | 3.0 | 3.2 | 3.3 | 3.4 | 3.4 | 3.3 | 3.1 | 2.8 | 3.1 | 3.1 | 2.9 | 2.7 | 3.1 | 3.2 | 3.4 | 3.5 | 3.4 | 3.4 | 3.5 | 3.3 | 3.1 | 3.1 | 3.1 | 3.3 | 3.0 | 3.0 | 3.5 | 3.7 |
| 3.7 | 3.9 | 3.7 | 3.6 | 3.2 | 3.0 | 3.0 | 3.0 | 2.9 | 2.8 | 2.9 | 3.4 | 3.0 | 3.0 | 2.9 | 2.7 | 2.8 | 2.8 | 2.9 | 2.8 | 2.8 | 2.9 | 3.7 | 4.4 | 3.9 | 3.2 | 3.8 | 4.2 | 4.2 | 3.8 | 3.9 | 4.3 | 3.7 | 3.2 | 3.2 | 3.5 |
| 2.8 | 2.9 | 2.9 | 2.9 | 3.2 | 3.3 | 3.2 | 3.3 | 3.4 | 3.4 | 3.0 | 2.6 | 2.6 | 2.3 | 2.5 | 2.9 | 3.3 | 3.1 | 3.3 | 3.5 | 3.9 | 3.3 | 2.6 | 2.1 | 2.9 | 3.0 | 2.3 | 1.9 | 2.0 | 2.2 | 2.1 | 1.8 | 2.0 | 2.3 | 2.5 | 2.6 |
| 2.8 | 2.9 | 2.9 | 2.9 | 2.8 | 2.7 | 2.7 | 2.7 | 2.5 | 2.3 | 2.6 | 2.8 | 2.9 | 3.0 | 3.0 | 2.8 | 2.9 | 3.0 | 3.0 | 2.7 | 2.4 | 2.2 | 1.9 | 1.8 | 1.8 | 1.6 | 1.3 | 1.3 | 1.6 | 1.8 | 1.8 | 1.6 | 1.6 | 2.0 | 2.8 | 2.8 |

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



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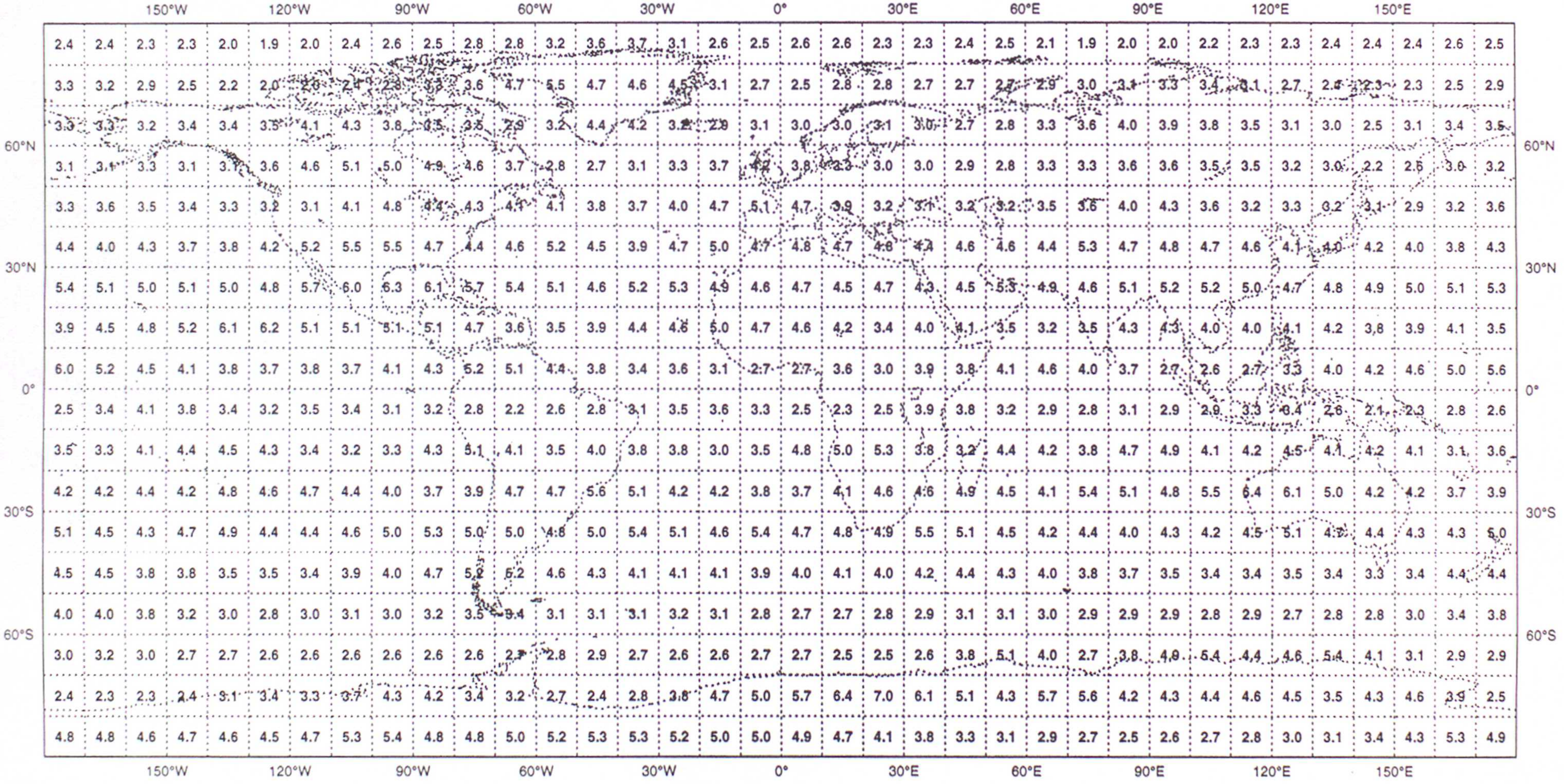
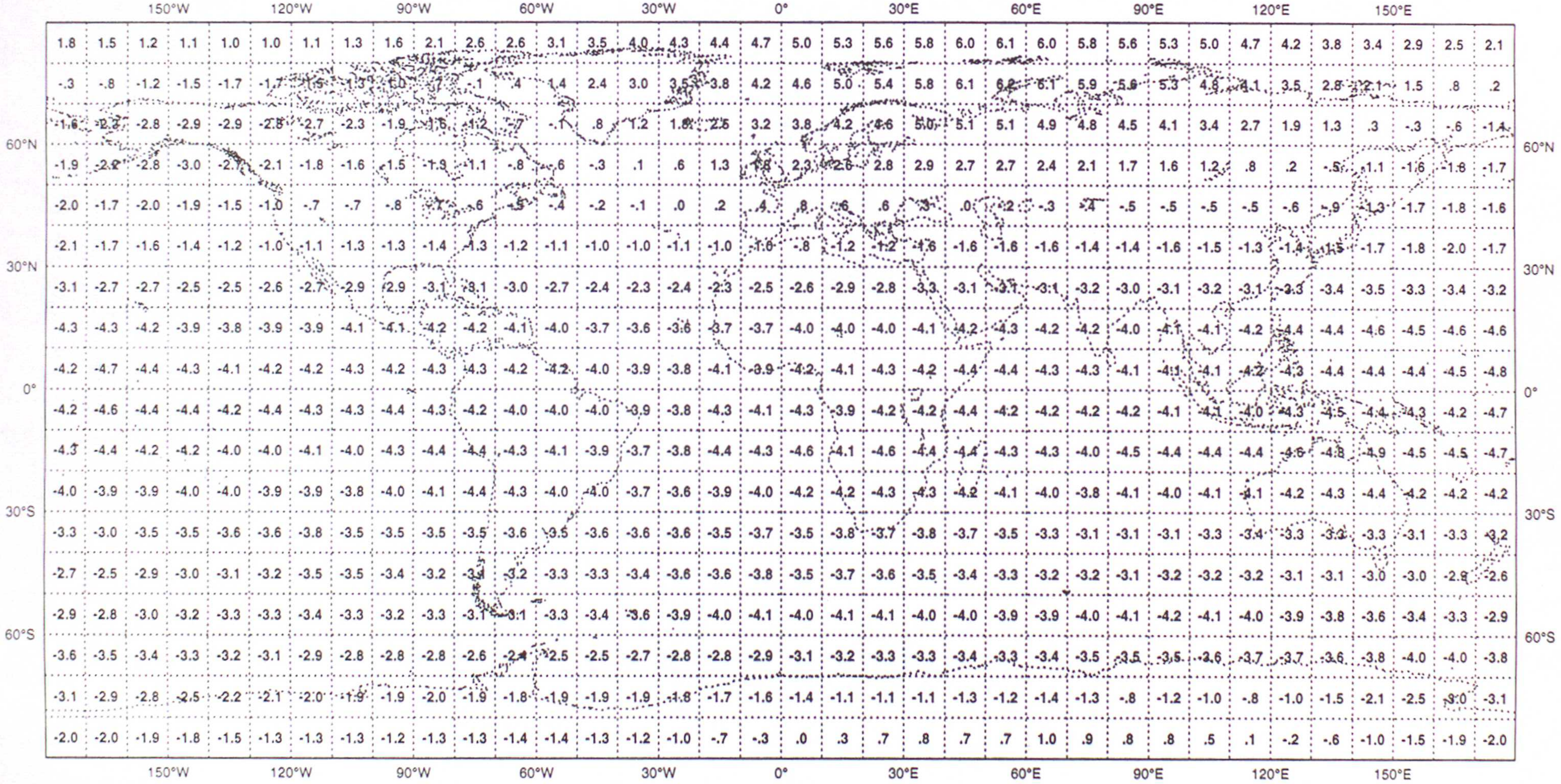
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9.6 | 9.7 | 9.7 | 9.9 | 10.1 | 10.2 | 10.2 | 10.3 | 10.4 | 11.4 | 11.9 | 11.6 | 12.7 | 13.3 | 13.4 | 12.0 | 10.7 | 9.9 | 9.3 | 9.3 | 9.7 | 10.2 | 10.6 | 10.9 | 11.8 | 12.1 | 12.0 | 11.7 | 11.5 | 11.2 | 10.9 | 10.5 | 10.2 | 9.9 | 9.6 | 9.6 |
| 6.9 | 7.0 | 7.3 | 7.6 | 8.0 | 8.3 | 8.9 | 8.8 | 8.0 | 8.3 | 7.6 | 8.1 | 10.0 | 13.3 | 13.6 | 10.0 | 6.4 | 4.9 | 4.4 | 5.4 | 6.3 | 6.8 | 7.3 | 8.8 | 9.8 | 10.3 | 10.8 | 10.9 | 10.5 | 8.8 | 9.5 | 8.8 | 8.1 | 7.9 | 7.6 | 7.2 |
| 4.1 | 3.6 | 4.5 | 5.5 | 6.4 | 6.7 | 7.4 | 8.5 | 8.8 | 8.6 | 8.2 | 7.4 | 4.9 | 7.7 | 4.5 | 3.6 | 2.7 | 2.6 | 3.1 | 3.1 | 2.9 | 4.0 | 5.1 | 5.9 | 6.8 | 7.6 | 8.3 | 8.8 | 8.3 | 7.8 | 8.0 | 8.8 | 9.2 | 6.8 | 5.4 | 4.4 |
| 1.4 | .9 | .7 | .7 | 2.2 | 4.3 | 4.7 | 5.4 | 6.0 | 7.1 | 7.4 | 7.1 | 4.2 | 2.7 | 1.4 | 1.0 | .5 | .7 | -.3 | -.1 | 1.3 | 2.6 | 2.8 | 3.7 | 3.5 | 4.0 | 4.8 | 5.3 | 4.9 | 5.4 | 5.7 | 6.0 | 5.4 | 3.9 | 2.9 | 2.1 |
| .0 | .8 | .2 | -.1 | .1 | 1.0 | 2.0 | 1.9 | 1.5 | 1.8 | 2.0 | 1.5 | .7 | .0 | -.1 | -.8 | -1.7 | -2.3 | -2.8 | -1.4 | .7 | 1.0 | 1.7 | 1.4 | .7 | 1.4 | 1.5 | 2.0 | 2.1 | 2.7 | 2.2 | 2.2 | 3.5 | 2.6 | 1.7 | 1.8 |
| -2.1 | -1.1 | -1.9 | -2.2 | -2.7 | -4.1 | -4.9 | -4.1 | -4.4 | -3.5 | -2.7 | -2.8 | -3.5 | -2.9 | -2.1 | -3.2 | -3.5 | -3.2 | -4.2 | -4.2 | -3.2 | -2.4 | -2.2 | -2.7 | -2.2 | .1 | -.2 | -1.4 | -2.2 | -1.4 | -1.1 | -.9 | -1.0 | -1.4 | -1.5 | -1.6 |
| -7.9 | -6.4 | -6.3 | -7.5 | -8.8 | -9.8 | -10.0 | -8.4 | -8.3 | -8.4 | -7.9 | -7.6 | -7.4 | -6.5 | -6.9 | -8.3 | -9.8 | -10.4 | -10.5 | -10.2 | -9.7 | -10.2 | -7.6 | -7.4 | -9.2 | -9.3 | -7.3 | -6.3 | -6.1 | -5.4 | -5.7 | -6.2 | -7.1 | -6.9 | -7.3 | -8.0 |
| -14.4 | -13.6 | -13.5 | -12.5 | -10.6 | -8.2 | -8.0 | -10.0 | -12.1 | -13.8 | -14.6 | -14.9 | -14.3 | -12.4 | -11.0 | -10.2 | -10.2 | -9.9 | -11.0 | -11.4 | -9.7 | -8.6 | -10.2 | -12.6 | -13.6 | -11.5 | -10.1 | -9.1 | -6.5 | -7.7 | -9.3 | -10.4 | -11.4 | -11.8 | -13.1 | -14.1 |
| -8.5 | -8.4 | -8.2 | -7.6 | -6.6 | -6.4 | -6.8 | -7.3 | -7.3 | -7.7 | -7.0 | -6.9 | -7.1 | -5.7 | -4.6 | -5.0 | -5.0 | -4.8 | -5.7 | -6.0 | -4.5 | -5.7 | -10.1 | -10.3 | -9.1 | -7.0 | -5.2 | -4.0 | -4.0 | -4.2 | -4.6 | -5.5 | -5.7 | -6.2 | -7.1 | -8.4 |
| -4.5 | -7.2 | -8.5 | -9.9 | -10.8 | -11.4 | -10.7 | -10.5 | -9.3 | -6.8 | -3.0 | -2.4 | -3.2 | -4.1 | -4.0 | -4.9 | -5.9 | -5.3 | -3.8 | -2.7 | -3.1 | -6.3 | -7.9 | -5.8 | -4.8 | -4.6 | -4.5 | -4.1 | -3.5 | -3.6 | -4.3 | -3.6 | -2.8 | -2.9 | -3.5 | -4.6 |
| -5.7 | -5.1 | -6.3 | -7.7 | -9.1 | -11.6 | -13.4 | -13.9 | -14.4 | -12.2 | -7.6 | -5.5 | -4.6 | -5.2 | -6.4 | -10.2 | -12.7 | -11.2 | -9.7 | -7.6 | -6.9 | -5.6 | -4.8 | -7.4 | -7.4 | -4.9 | -7.7 | -8.4 | -8.3 | -9.2 | -9.7 | -9.1 | -8.5 | -6.5 | -5.4 | -7.0 |
| -5.9 | -5.1 | -4.9 | -4.4 | -5.5 | -7.8 | -8.8 | -10.0 | -12.6 | -14.2 | -14.4 | -9.4 | -8.2 | -7.6 | -6.0 | -7.1 | -10.2 | -12.1 | -13.0 | -11.9 | -11.6 | -11.3 | -9.0 | -8.9 | -8.5 | -7.0 | -8.7 | -10.1 | -9.9 | -9.3 | -8.8 | -10.1 | -10.1 | -8.7 | -8.1 | -6.6 |
| -5.6 | -4.9 | -5.3 | -5.2 | -4.7 | -4.0 | -5.0 | -5.6 | -6.8 | -7.9 | -9.2 | -7.3 | -6.5 | -7.3 | -7.3 | -6.5 | -6.2 | -7.3 | -7.2 | -8.1 | -7.4 | -7.6 | -7.1 | -6.5 | -5.0 | -5.9 | -6.1 | -6.6 | -6.6 | -6.8 | -6.6 | -7.0 | -7.0 | -5.3 | -5.0 | -6.6 |
| -3.2 | -3.0 | -2.9 | -2.2 | -2.5 | -2.0 | -1.5 | -1.8 | -1.9 | -3.0 | -3.5 | -3.7 | -3.4 | -2.7 | -2.4 | -1.7 | -1.6 | -1.6 | -1.7 | -2.2 | -2.4 | -2.8 | -2.9 | -2.8 | -2.6 | -2.2 | -1.4 | -.8 | -.8 | -1.0 | -1.4 | -1.9 | -1.7 | -2.1 | -2.8 | -3.7 |
| -1.0 | -.3 | -.1 | .5 | .6 | .8 | .8 | .4 | .4 | .3 | .4 | .6 | .5 | .5 | .5 | 1.0 | 1.4 | 1.7 | 1.9 | 1.2 | 1.3 | 1.5 | 1.2 | 1.3 | 1.3 | 1.6 | 1.8 | 1.4 | 1.2 | 1.3 | 1.0 | .8 | .4 | .0 | .0 | -.4 |
| 2.3 | 2.3 | 2.4 | 2.2 | 2.2 | 2.1 | 2.2 | 2.0 | 2.0 | 1.9 | 2.3 | 3.0 | 3.0 | 3.3 | 3.5 | 3.4 | 3.1 | 3.5 | 3.1 | 2.8 | 3.0 | 3.4 | 4.5 | 6.0 | 4.9 | 3.7 | 5.2 | 6.1 | 6.1 | 5.1 | 5.4 | 6.2 | 4.9 | 3.2 | 2.1 | 2.3 |
| 5.6 | 5.0 | 4.8 | 5.0 | 5.6 | 5.7 | 5.2 | 5.0 | 6.4 | 6.3 | 5.9 | 7.1 | 6.1 | 5.9 | 5.7 | 6.2 | 8.3 | 11.0 | 12.4 | 13.7 | 14.1 | 15.8 | 18.5 | 21.3 | 15.3 | 15.1 | 19.3 | 20.8 | 22.8 | 22.7 | 23.3 | 23.3 | 20.9 | 17.1 | 9.3 | 6.4 |
| 9.7 | 9.4 | 9.1 | 9.5 | 9.9 | 10.4 | 11.1 | 12.9 | 15.6 | 15.0 | 12.7 | 11.6 | 12.0 | 12.8 | 13.7 | 15.2 | 16.1 | 16.8 | 17.9 | 19.2 | 20.9 | 23.2 | 24.3 | 25.0 | 25.7 | 25.6 | 25.7 | 26.4 | 26.6 | 26.1 | 25.0 | 23.4 | 20.6 | 16.8 | 12.1 | 10.3 |

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



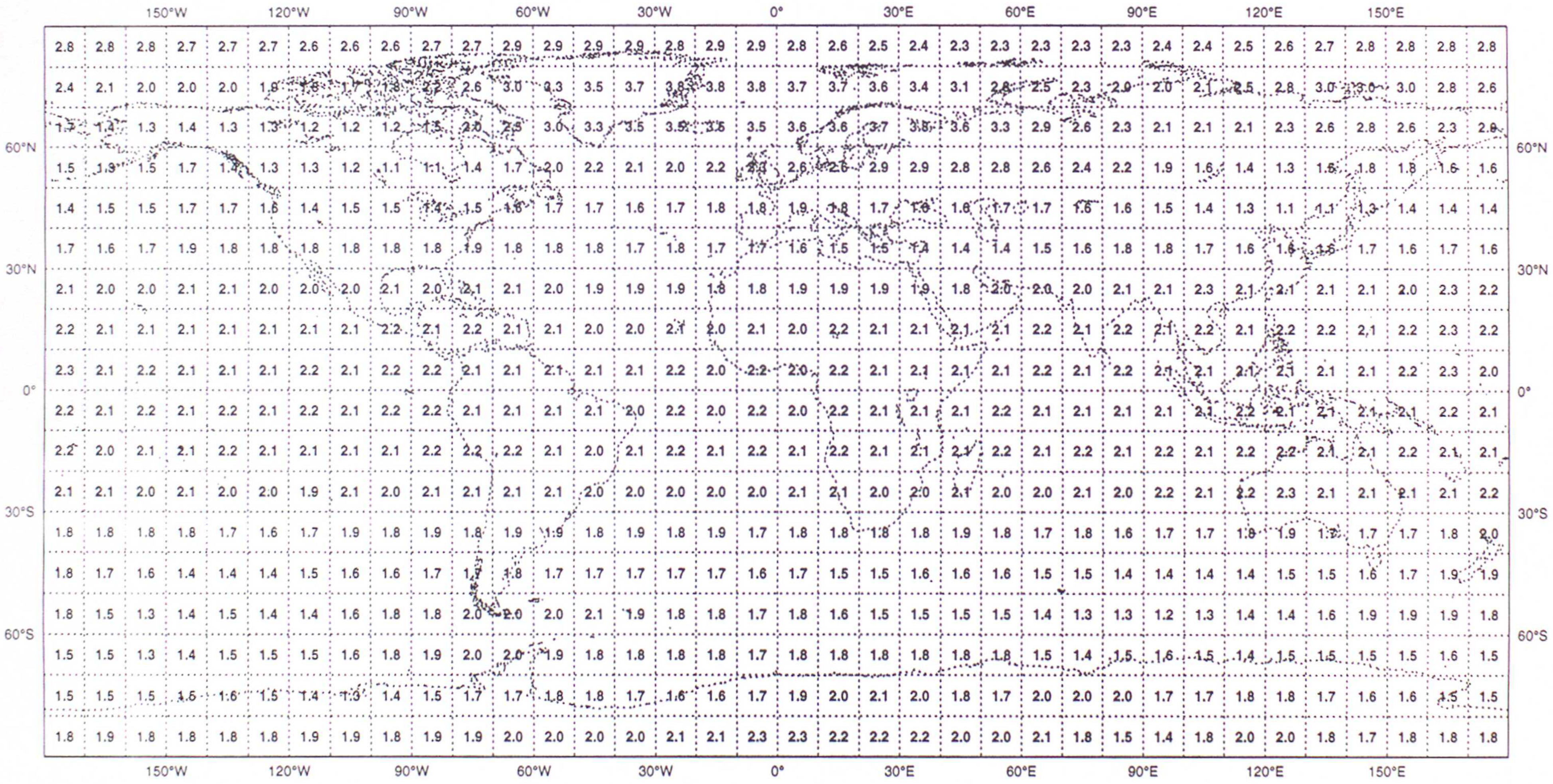
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.4 | 2.4 | 2.3 | 2.3 | 2.0 | 1.9 | 2.0 | 2.4 | 2.6 | 2.5 | 2.8 | 2.8 | 3.2 | 3.6 | 3.7 | 3.1 | 2.6 | 2.5 | 2.6 | 2.6 | 2.3 | 2.3 | 2.4 | 2.5 | 2.1 | 1.9 | 2.0 | 2.0 | 2.2 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.6 | 2.5 |
| 3.3 | 3.2 | 2.9 | 2.5 | 2.2 | 2.0 | 2.0 | 2.4 | 2.8 | 3.3 | 3.6 | 4.7 | 5.5 | 4.7 | 4.6 | 4.5 | 3.1 | 2.7 | 2.5 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.9 | 3.0 | 3.1 | 3.3 | 3.4 | 3.1 | 2.7 | 2.4 | 2.3 | 2.3 | 2.5 | 2.9 |
| 3.3 | 3.3 | 3.2 | 3.4 | 3.4 | 3.5 | 4.1 | 4.3 | 3.8 | 3.5 | 3.5 | 2.9 | 3.2 | 4.4 | 4.2 | 3.2 | 2.9 | 3.1 | 3.0 | 3.0 | 3.1 | 3.0 | 2.7 | 2.8 | 3.3 | 3.6 | 4.0 | 3.9 | 3.8 | 3.5 | 3.1 | 3.0 | 2.5 | 3.1 | 3.4 | 3.5 |
| 3.1 | 3.1 | 3.3 | 3.1 | 3.1 | 3.6 | 4.6 | 5.1 | 5.0 | 4.9 | 4.6 | 3.7 | 2.8 | 2.7 | 3.1 | 3.3 | 3.7 | 4.2 | 3.8 | 2.3 | 3.0 | 3.0 | 2.9 | 2.8 | 3.3 | 3.3 | 3.6 | 3.6 | 3.5 | 3.5 | 3.2 | 3.0 | 2.2 | 2.6 | 3.0 | 3.2 |
| 3.3 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 4.1 | 4.8 | 4.4 | 4.3 | 4.1 | 4.1 | 3.8 | 3.7 | 4.0 | 4.7 | 5.1 | 4.7 | 3.9 | 3.2 | 3.1 | 3.2 | 3.2 | 3.5 | 3.6 | 4.0 | 4.3 | 3.6 | 3.2 | 3.3 | 3.2 | 3.1 | 2.9 | 3.2 | 3.6 |
| 4.4 | 4.0 | 4.3 | 3.7 | 3.8 | 4.2 | 5.2 | 5.5 | 5.5 | 4.7 | 4.4 | 4.6 | 5.2 | 4.5 | 3.9 | 4.7 | 5.0 | 4.7 | 4.8 | 4.7 | 4.8 | 4.4 | 4.6 | 4.6 | 4.4 | 5.3 | 4.7 | 4.8 | 4.7 | 4.6 | 4.1 | 4.0 | 4.2 | 4.0 | 3.8 | 4.3 |
| 5.4 | 5.1 | 5.0 | 5.1 | 5.0 | 4.8 | 5.7 | 6.0 | 6.3 | 6.1 | 5.7 | 5.4 | 5.1 | 4.6 | 5.2 | 5.3 | 4.9 | 4.6 | 4.7 | 4.5 | 4.7 | 4.3 | 4.5 | 5.3 | 4.9 | 4.6 | 5.1 | 5.2 | 5.2 | 5.0 | 4.7 | 4.8 | 4.9 | 5.0 | 5.1 | 5.3 |
| 3.9 | 4.5 | 4.8 | 5.2 | 6.1 | 6.2 | 5.1 | 5.1 | 5.1 | 5.1 | 4.7 | 3.6 | 3.5 | 3.9 | 4.4 | 4.6 | 5.0 | 4.7 | 4.6 | 4.2 | 3.4 | 4.0 | 4.1 | 3.5 | 3.2 | 3.5 | 4.3 | 4.3 | 4.0 | 4.0 | 4.1 | 4.2 | 3.8 | 3.9 | 4.1 | 3.5 |
| 6.0 | 5.2 | 4.5 | 4.1 | 3.8 | 3.7 | 3.8 | 3.7 | 4.1 | 4.3 | 5.2 | 5.1 | 4.4 | 3.8 | 3.4 | 3.6 | 3.1 | 2.7 | 2.7 | 3.6 | 3.0 | 3.9 | 3.8 | 4.1 | 4.6 | 4.0 | 3.7 | 2.7 | 2.6 | 2.7 | 3.3 | 4.0 | 4.2 | 4.6 | 5.0 | 5.6 |
| 2.5 | 3.4 | 4.1 | 3.8 | 3.4 | 3.2 | 3.5 | 3.4 | 3.1 | 3.2 | 2.8 | 2.2 | 2.6 | 2.8 | 3.1 | 3.5 | 3.6 | 3.3 | 2.5 | 2.3 | 2.5 | 3.9 | 3.8 | 3.2 | 2.9 | 2.8 | 3.1 | 2.9 | 2.9 | 3.3 | 3.4 | 2.6 | 2.1 | 2.3 | 2.8 | 2.6 |
| 3.5 | 3.3 | 4.1 | 4.4 | 4.5 | 4.3 | 3.4 | 3.2 | 3.3 | 4.3 | 5.1 | 4.1 | 3.5 | 4.0 | 3.8 | 3.8 | 3.0 | 3.5 | 4.8 | 5.0 | 5.3 | 3.8 | 3.2 | 4.4 | 4.2 | 3.8 | 4.7 | 4.9 | 4.1 | 4.2 | 4.5 | 4.1 | 4.2 | 4.1 | 3.1 | 3.6 |
| 4.2 | 4.2 | 4.4 | 4.2 | 4.8 | 4.6 | 4.7 | 4.4 | 4.0 | 3.7 | 3.9 | 4.7 | 4.7 | 5.6 | 5.1 | 4.2 | 4.2 | 3.8 | 3.7 | 4.1 | 4.6 | 4.6 | 4.9 | 4.5 | 4.1 | 5.4 | 5.1 | 4.8 | 5.5 | 6.4 | 6.1 | 5.0 | 4.2 | 4.2 | 3.7 | 3.9 |
| 5.1 | 4.5 | 4.3 | 4.7 | 4.9 | 4.4 | 4.4 | 4.6 | 5.0 | 5.3 | 5.0 | 5.0 | 4.8 | 5.0 | 5.4 | 5.1 | 4.6 | 5.4 | 4.7 | 4.8 | 4.9 | 5.5 | 5.1 | 4.5 | 4.2 | 4.4 | 4.0 | 4.3 | 4.2 | 4.5 | 5.1 | 4.7 | 4.4 | 4.3 | 4.3 | 5.0 |
| 4.5 | 4.5 | 3.8 | 3.8 | 3.5 | 3.5 | 3.4 | 3.9 | 4.0 | 4.7 | 5.2 | 5.2 | 4.6 | 4.3 | 4.1 | 4.1 | 4.1 | 3.9 | 4.0 | 4.1 | 4.0 | 4.2 | 4.4 | 4.3 | 4.0 | 3.8 | 3.7 | 3.5 | 3.4 | 3.4 | 3.5 | 3.4 | 3.3 | 3.4 | 4.4 | 4.4 |
| 4.0 | 4.0 | 3.8 | 3.2 | 3.0 | 2.8 | 3.0 | 3.1 | 3.0 | 3.2 | 3.5 | 3.4 | 3.1 | 3.1 | 3.1 | 3.2 | 3.1 | 2.8 | 2.7 | 2.7 | 2.8 | 2.9 | 3.1 | 3.1 | 3.0 | 2.9 | 2.9 | 2.9 | 2.8 | 2.9 | 2.7 | 2.8 | 2.8 | 3.0 | 3.4 | 3.8 |
| 3.0 | 3.2 | 3.0 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.7 | 2.8 | 2.9 | 2.7 | 2.6 | 2.6 | 2.7 | 2.7 | 2.5 | 2.5 | 2.6 | 3.8 | 5.1 | 4.0 | 2.7 | 3.8 | 4.9 | 5.4 | 4.4 | 4.6 | 5.4 | 4.1 | 3.1 | 2.9 | 2.9 |
| 2.4 | 2.3 | 2.3 | 2.4 | 3.1 | 3.4 | 3.3 | 3.7 | 4.3 | 4.2 | 3.4 | 3.2 | 2.7 | 2.4 | 2.8 | 3.8 | 4.7 | 5.0 | 5.7 | 6.4 | 7.0 | 6.1 | 5.1 | 4.3 | 5.7 | 5.6 | 4.2 | 4.3 | 4.4 | 4.6 | 4.5 | 3.5 | 4.3 | 4.6 | 3.9 | 2.5 |
| 4.8 | 4.8 | 4.6 | 4.7 | 4.6 | 4.5 | 4.7 | 5.3 | 5.4 | 4.8 | 4.8 | 5.0 | 5.2 | 5.3 | 5.3 | 5.2 | 5.0 | 5.0 | 4.9 | 4.7 | 4.1 | 3.8 | 3.3 | 3.1 | 2.9 | 2.7 | 2.5 | 2.6 | 2.7 | 2.8 | 3.0 | 3.1 | 3.4 | 4.3 | 5.3 | 4.9 |

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.8 | 1.5 | 1.2 | 1.1 | 1.0 | 1.0 | 1.1 | 1.3 | 1.6 | 2.1 | 2.6 | 2.6 | 3.1 | 3.5 | 4.0 | 4.3 | 4.4 | 4.7 | 5.0 | 5.3 | 5.6 | 5.8 | 6.0 | 6.1 | 6.0 | 5.8 | 5.6 | 5.3 | 5.0 | 4.7 | 4.2 | 3.8 | 3.4 | 2.9 | 2.5 | 2.1 |
| -.3 | -.8 | -1.2 | -1.5 | -1.7 | -1.7 | -1.5 | -1.3 | -1.0 | -.7 | -.1 | .4 | 1.4 | 2.4 | 3.0 | 3.5 | 3.8 | 4.2 | 4.6 | 5.0 | 5.4 | 5.8 | 6.1 | 6.2 | 6.1 | 5.9 | 5.6 | 5.3 | 4.8 | 4.1 | 3.5 | 2.8 | 2.1 | 1.5 | .8 | .2 |
| -1.6 | -2.2 | -2.8 | -2.9 | -2.9 | -2.8 | -2.7 | -2.3 | -1.9 | -1.6 | -1.2 | -.7 | -.1 | .8 | 1.2 | 1.8 | 2.5 | 3.2 | 3.8 | 4.2 | 4.6 | 5.0 | 5.1 | 5.1 | 4.9 | 4.8 | 4.5 | 4.1 | 3.4 | 2.7 | 1.9 | 1.3 | .3 | -.3 | -.6 | -1.4 |
| -1.9 | -2.2 | -2.8 | -3.0 | -2.7 | -2.1 | -1.8 | -1.6 | -1.5 | -1.3 | -1.1 | -.8 | -.6 | -.3 | .1 | .6 | 1.3 | 1.8 | 2.3 | 2.6 | 2.8 | 2.9 | 2.7 | 2.7 | 2.4 | 2.1 | 1.7 | 1.6 | 1.2 | .8 | .2 | -.5 | -1.1 | -1.6 | -1.8 | -1.7 |
| -2.0 | -1.7 | -2.0 | -1.9 | -1.5 | -1.0 | -.7 | -.7 | -.8 | -.7 | -.6 | -.5 | -.4 | -.2 | -.1 | .0 | .2 | .4 | .8 | .6 | .6 | .3 | .0 | -.2 | -.3 | -.4 | -.5 | -.5 | -.5 | -.5 | -.6 | -.9 | -1.3 | -1.7 | -1.8 | -1.6 |
| -2.1 | -1.7 | -1.6 | -1.4 | -1.2 | -1.0 | -1.1 | -1.3 | -1.3 | -1.4 | -1.3 | -1.2 | -1.1 | -1.0 | -1.0 | -1.1 | -1.0 | -1.6 | -.8 | -1.2 | -1.2 | -1.6 | -1.6 | -1.6 | -1.6 | -1.4 | -1.4 | -1.6 | -1.5 | -1.3 | -1.4 | -1.5 | -1.7 | -1.8 | -2.0 | -1.7 |
| -3.1 | -2.7 | -2.7 | -2.5 | -2.5 | -2.6 | -2.7 | -2.9 | -2.9 | -3.1 | -3.1 | -3.0 | -2.7 | -2.4 | -2.3 | -2.4 | -2.3 | -2.5 | -2.6 | -2.9 | -2.8 | -3.3 | -3.1 | -3.1 | -3.1 | -3.2 | -3.0 | -3.1 | -3.2 | -3.1 | -3.3 | -3.4 | -3.5 | -3.3 | -3.4 | -3.2 |
| -4.3 | -4.3 | -4.2 | -3.9 | -3.8 | -3.9 | -3.9 | -4.1 | -4.1 | -4.2 | -4.2 | -4.1 | -4.0 | -3.7 | -3.6 | -3.6 | -3.7 | -3.7 | -4.0 | -4.0 | -4.0 | -4.1 | -4.2 | -4.3 | -4.2 | -4.2 | -4.0 | -4.1 | -4.1 | -4.2 | -4.4 | -4.4 | -4.6 | -4.5 | -4.6 | -4.6 |
| -4.2 | -4.7 | -4.4 | -4.3 | -4.1 | -4.2 | -4.2 | -4.3 | -4.2 | -4.3 | -4.3 | -4.2 | -4.2 | -4.0 | -3.9 | -3.8 | -4.1 | -3.9 | -4.2 | -4.1 | -4.3 | -4.2 | -4.4 | -4.4 | -4.3 | -4.3 | -4.1 | -4.1 | -4.1 | -4.2 | -4.3 | -4.4 | -4.4 | -4.4 | -4.5 | -4.8 |
| -4.2 | -4.6 | -4.4 | -4.4 | -4.2 | -4.4 | -4.3 | -4.3 | -4.4 | -4.3 | -4.2 | -4.0 | -4.0 | -4.0 | -3.9 | -3.8 | -4.3 | -4.1 | -4.3 | -3.9 | -4.2 | -4.2 | -4.4 | -4.2 | -4.2 | -4.2 | -4.2 | -4.1 | -4.1 | -4.0 | -4.3 | -4.5 | -4.4 | -4.3 | -4.2 | -4.7 |
| -4.3 | -4.4 | -4.2 | -4.2 | -4.0 | -4.0 | -4.1 | -4.0 | -4.3 | -4.4 | -4.4 | -4.3 | -4.1 | -3.9 | -3.7 | -3.8 | -4.4 | -4.3 | -4.6 | -4.1 | -4.6 | -4.4 | -4.4 | -4.3 | -4.3 | -4.0 | -4.5 | -4.4 | -4.4 | -4.4 | -4.6 | -4.8 | -4.9 | -4.5 | -4.5 | -4.7 |
| -4.0 | -3.9 | -3.9 | -4.0 | -4.0 | -3.9 | -3.9 | -3.8 | -4.0 | -4.1 | -4.4 | -4.3 | -4.0 | -4.0 | -3.7 | -3.6 | -3.9 | -4.0 | -4.2 | -4.2 | -4.3 | -4.3 | -4.2 | -4.1 | -4.0 | -3.8 | -4.1 | -4.0 | -4.1 | -4.1 | -4.2 | -4.3 | -4.4 | -4.2 | -4.2 | -4.2 |
| -3.3 | -3.0 | -3.5 | -3.5 | -3.6 | -3.6 | -3.8 | -3.5 | -3.5 | -3.5 | -3.5 | -3.6 | -3.5 | -3.6 | -3.6 | -3.6 | -3.5 | -3.7 | -3.5 | -3.8 | -3.7 | -3.8 | -3.7 | -3.5 | -3.3 | -3.1 | -3.1 | -3.1 | -3.3 | -3.4 | -3.3 | -3.3 | -3.3 | -3.1 | -3.3 | -3.2 |
| -2.7 | -2.5 | -2.9 | -3.0 | -3.1 | -3.2 | -3.5 | -3.5 | -3.4 | -3.2 | -3.1 | -3.2 | -3.3 | -3.3 | -3.4 | -3.6 | -3.6 | -3.8 | -3.5 | -3.7 | -3.6 | -3.5 | -3.4 | -3.3 | -3.2 | -3.2 | -3.1 | -3.2 | -3.2 | -3.2 | -3.1 | -3.1 | -3.0 | -3.0 | -2.8 | -2.6 |
| -2.9 | -2.8 | -3.0 | -3.2 | -3.3 | -3.3 | -3.4 | -3.3 | -3.2 | -3.3 | -3.1 | -3.1 | -3.3 | -3.4 | -3.6 | -3.9 | -4.0 | -4.1 | -4.0 | -4.1 | -4.1 | -4.0 | -4.0 | -3.9 | -3.9 | -4.0 | -4.1 | -4.2 | -4.1 | -4.0 | -3.9 | -3.8 | -3.6 | -3.4 | -3.3 | -2.9 |
| -3.6 | -3.5 | -3.4 | -3.3 | -3.2 | -3.1 | -2.9 | -2.8 | -2.8 | -2.8 | -2.6 | -2.4 | -2.5 | -2.5 | -2.7 | -2.8 | -2.8 | -2.9 | -3.1 | -3.2 | -3.3 | -3.3 | -3.4 | -3.3 | -3.4 | -3.5 | -3.5 | -3.5 | -3.6 | -3.7 | -3.7 | -3.6 | -3.8 | -4.0 | -4.0 | -3.8 |
| -3.1 | -2.9 | -2.8 | -2.5 | -2.2 | -2.1 | -2.0 | -1.9 | -1.9 | -2.0 | -1.9 | -1.8 | -1.9 | -1.9 | -1.9 | -1.8 | -1.7 | -1.6 | -1.4 | -1.1 | -1.1 | -1.1 | -1.3 | -1.2 | -1.4 | -1.3 | -.8 | -1.2 | -1.0 | -.8 | -1.0 | -1.5 | -2.1 | -2.5 | -3.0 | -3.1 |
| -2.0 | -2.0 | -1.9 | -1.8 | -1.5 | -1.3 | -1.3 | -1.3 | -1.2 | -1.3 | -1.3 | -1.4 | -1.4 | -1.3 | -1.2 | -1.0 | -.7 | -.3 | .0 | .3 | .7 | .8 | .7 | .7 | 1.0 | .9 | .8 | .8 | .5 | .1 | -.2 | -.6 | -1.0 | -1.5 | -1.9 | -2.0 |

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.7 | 2.7 | 2.9 | 2.9 | 2.9 | 2.9 | 2.8 | 2.9 | 2.9 | 2.8 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 | 2.8 | 2.8 |
| 2.4 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.8 | 1.7 | 1.8 | 2.2 | 2.6 | 3.0 | 3.3 | 3.5 | 3.7 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.4 | 3.1 | 2.8 | 2.5 | 2.3 | 2.0 | 2.0 | 2.1 | 2.5 | 2.8 | 3.0 | 3.0 | 3.0 | 2.8 | 2.6 |
| 1.7 | 1.4 | 1.3 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.5 | 2.0 | 2.5 | 3.0 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 | 3.6 | 3.7 | 3.8 | 3.6 | 3.3 | 2.9 | 2.6 | 2.3 | 2.1 | 2.1 | 2.1 | 2.3 | 2.6 | 2.8 | 2.6 | 2.3 | 2.8 |
| 1.5 | 1.3 | 1.5 | 1.7 | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 | 1.1 | 1.4 | 1.7 | 2.0 | 2.2 | 2.1 | 2.0 | 2.2 | 2.3 | 2.6 | 2.6 | 2.9 | 2.9 | 2.8 | 2.8 | 2.6 | 2.4 | 2.2 | 1.9 | 1.6 | 1.4 | 1.3 | 1.6 | 1.8 | 1.8 | 1.6 | 1.6 |
| 1.4 | 1.5 | 1.5 | 1.7 | 1.7 | 1.6 | 1.4 | 1.5 | 1.5 | 1.4 | 1.5 | 1.6 | 1.7 | 1.7 | 1.6 | 1.7 | 1.8 | 1.8 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.3 | 1.1 | 1.1 | 1.3 | 1.4 | 1.4 | 1.4 |
| 1.7 | 1.6 | 1.7 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.8 | 1.7 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.5 | 1.6 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.7 | 1.6 | 1.7 | 1.6 |
| 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.3 | 2.2 |
| 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.0 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | 2.3 | 2.2 |
| 2.3 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.0 | 2.2 | 2.0 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.0 |
| 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.2 | 2.0 | 2.2 | 2.0 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 |
| 2.2 | 2.0 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 |
| 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 1.9 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.2 | 2.1 | 2.2 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 |
| 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.6 | 1.7 | 1.9 | 1.8 | 1.9 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | 1.8 | 1.9 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.8 | 1.7 | 1.8 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 1.7 | 1.7 | 1.7 | 1.8 | 2.0 |
| 1.8 | 1.7 | 1.6 | 1.4 | 1.4 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.7 | 1.5 | 1.5 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.9 | 1.9 |
| 1.8 | 1.5 | 1.3 | 1.4 | 1.5 | 1.4 | 1.4 | 1.6 | 1.8 | 1.8 | 2.0 | 2.0 | 2.0 | 2.1 | 1.9 | 1.8 | 1.8 | 1.7 | 1.8 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 | 1.3 | 1.4 | 1.4 | 1.6 | 1.9 | 1.9 | 1.9 | 1.8 |
| 1.5 | 1.5 | 1.3 | 1.4 | 1.5 | 1.5 | 1.5 | 1.6 | 1.8 | 1.9 | 2.0 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.5 | 1.4 | 1.5 | 1.6 | 1.5 | 1.4 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.5 |
| 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.5 | 1.4 | 1.3 | 1.4 | 1.5 | 1.7 | 1.7 | 1.8 | 1.7 | 1.8 | 1.6 | 1.6 | 1.7 | 1.9 | 2.0 | 2.1 | 2.0 | 1.8 | 1.7 | 2.0 | 2.0 | 2.0 | 1.7 | 1.7 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 |
| 1.8 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.1 | 1.8 | 1.5 | 1.4 | 1.8 | 2.0 | 2.0 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 |

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

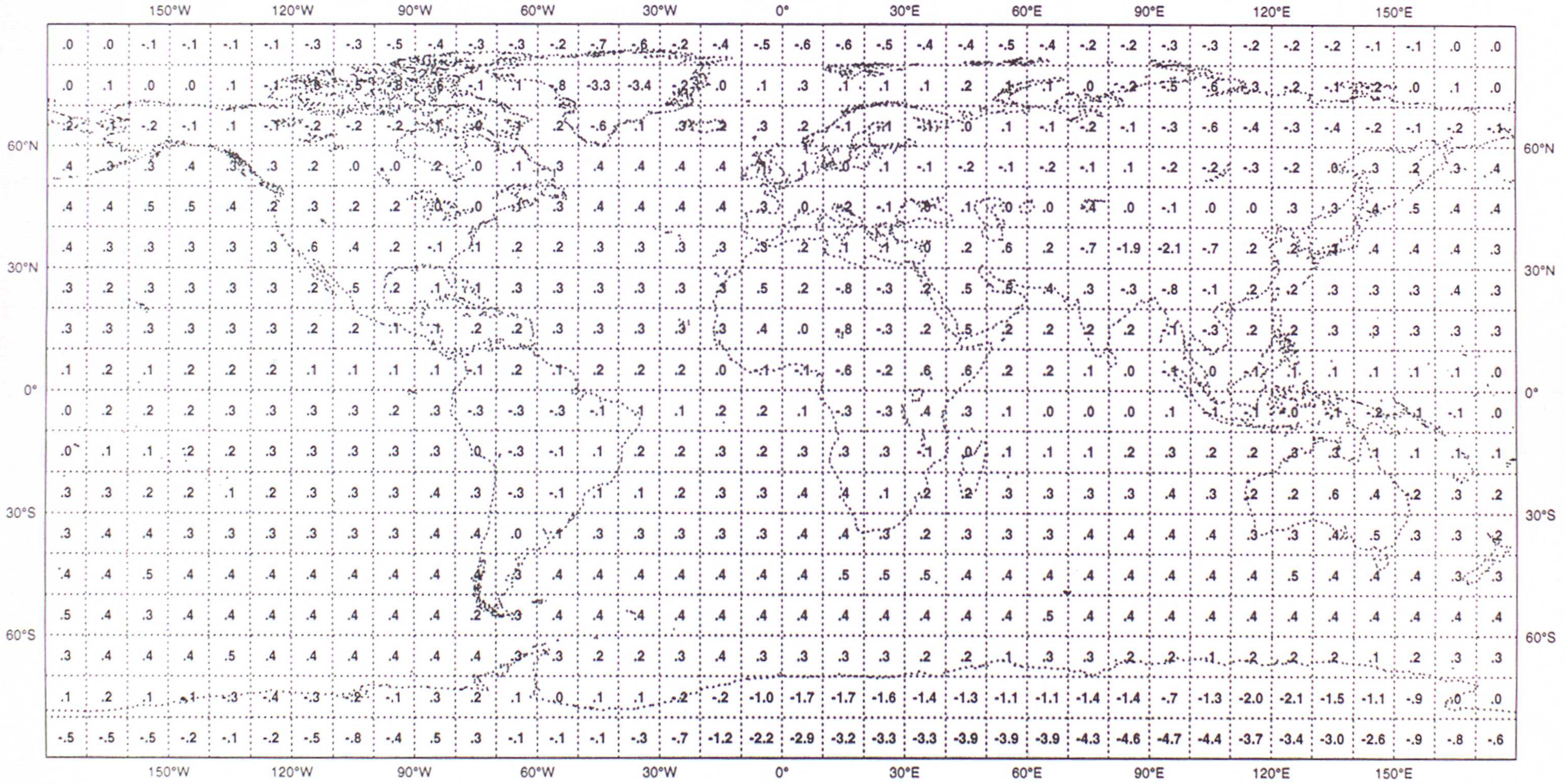

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.0 .0 -.1 -.1 -.1 -.1 -.3 -.3 -.5 -.4 -.3 -.3 -.2 -.7 -.6 -.2 -.4 -.5 -.6 -.6 -.5 -.4 -.4 -.5 -.4 -.2 -.2 -.3 -.3 -.2 -.2 -.2 -.1 -.1 .0 .0
.0 .1 .0 .0 .1 -.1 .8 .5 .3 .6 -.1 .1 -.8 -3.3 -3.4 -.2 .0 .1 .3 .1 .1 .1 .2 .1 .1 .0 -.2 -.5 -.6 -.3 -.2 -.1 -.2 .0 .1 .0
.2 -.1 -.2 -.1 .1 -.1 -.2 -.2 -.2 -.1 .0 -.1 .2 -.6 .1 .3 .2 .3 .2 -.1 -.1 -.1 .0 .1 -.1 -.2 -.1 -.3 -.6 -.4 -.3 -.4 -.2 -.1 -.2 -.1
.4 .3 .3 .4 .3 .3 .2 .0 .0 .2 .0 .1 .3 .4 .4 .4 .4 .1 .1 .0 .1 -.1 -.2 -.1 -.2 -.1 .1 -.2 -.2 -.3 -.2 .0 .3 .2 .3 .4
.4 .4 .5 .5 .4 .2 .3 .2 .2 .0 .0 .1 .3 .4 .4 .4 .4 .3 .0 -.2 -.1 .0 .1 .0 .0 -.4 .0 -.1 .0 .0 .3 .3 .4 .5 .4 .4
.4 .3 .3 .3 .3 .3 .6 .4 .2 -.1 .1 .2 .2 .3 .3 .3 .3 .3 .2 .1 .1 .0 .2 .6 .2 -.7 -1.9 -2.1 -.7 .2 .2 .3 .4 .4 .4 .3
.3 .2 .3 .3 .3 .3 .2 .5 .2 .1 .1 .3 .3 .3 .3 .3 .3 .5 .2 -.8 -.3 .2 .5 .5 .4 .3 -.3 -.8 -.1 .2 .2 .3 .3 .3 .4 .3
.3 .3 .3 .3 .3 .3 .2 .2 .1 .1 .2 .2 .3 .3 .3 .3 .3 .4 .0 -.8 -.3 .2 .5 .2 .2 .2 .2 -.1 -.3 .2 .2 .3 .3 .3 .3 .3
.1 .2 .1 .2 .2 .2 .1 .1 .1 .1 -.1 .2 .1 .2 .2 .2 .0 -.1 -.1 -.6 -.2 .6 .6 .2 .2 .1 .0 -.1 .0 -.1 .1 .1 .1 .1 .1 .0
.0 .2 .2 .2 .3 .3 .3 .3 .2 .3 -.3 -.3 -.3 -.1 .1 .1 .2 .2 .1 -.3 -.3 .4 .3 .1 .0 .0 .0 .1 -.1 -.1 .0 -.1 -.2 -.1 -.1 .0
.0 .1 .1 .2 .2 .3 .3 .3 .3 .3 .0 -.3 -.1 .1 .2 .2 .3 .2 .3 .3 .3 -.1 .0 .1 .1 .1 .2 .3 .2 .2 .3 .3 .1 .1 .1 .1
.3 .3 .2 .2 .1 .2 .3 .3 .3 .4 .3 -.3 -.1 .1 .1 .2 .3 .3 .4 .4 .1 .2 .2 .3 .3 .3 .3 .4 .3 .2 .2 .6 .4 .2 .3 .2
.3 .4 .4 .3 .3 .3 .3 .3 .3 .4 .4 .0 .1 .3 .3 .3 .3 .3 .4 .4 .3 .2 .3 .3 .3 .4 .4 .4 .4 .3 .3 .4 .5 .3 .3 .2
.4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .3 .3
.5 .4 .3 .4 .4 .4 .4 .4 .4 .4 .2 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.3 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .2 .2 .3 .4 .3 .3 .3 .3 .2 .2 .1 .3 .3 .2 .2 .1 .2 .2 .2 .1 .2 .3 .3
.1 .2 .1 -.1 -.3 -.4 -.3 -.2 -.1 .3 .2 .1 .0 .1 .1 -.2 -.2 -1.0 -1.7 -1.7 -1.6 -1.4 -1.3 -1.1 -1.1 -1.4 -1.4 -.7 -1.3 -2.0 -2.1 -1.5 -1.1 -.9 .0 .0
-.5 -.5 -.5 -.2 -.1 -.2 -.5 -.8 -.4 .5 .3 -.1 -.1 -.1 -.3 -.7 -1.2 -2.2 -2.9 -3.2 -3.3 -3.3 -3.9 -3.9 -3.9 -4.3 -4.6 -4.7 -4.4 -3.7 -3.4 -3.0 -2.6 -.9 -.8 -.6

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

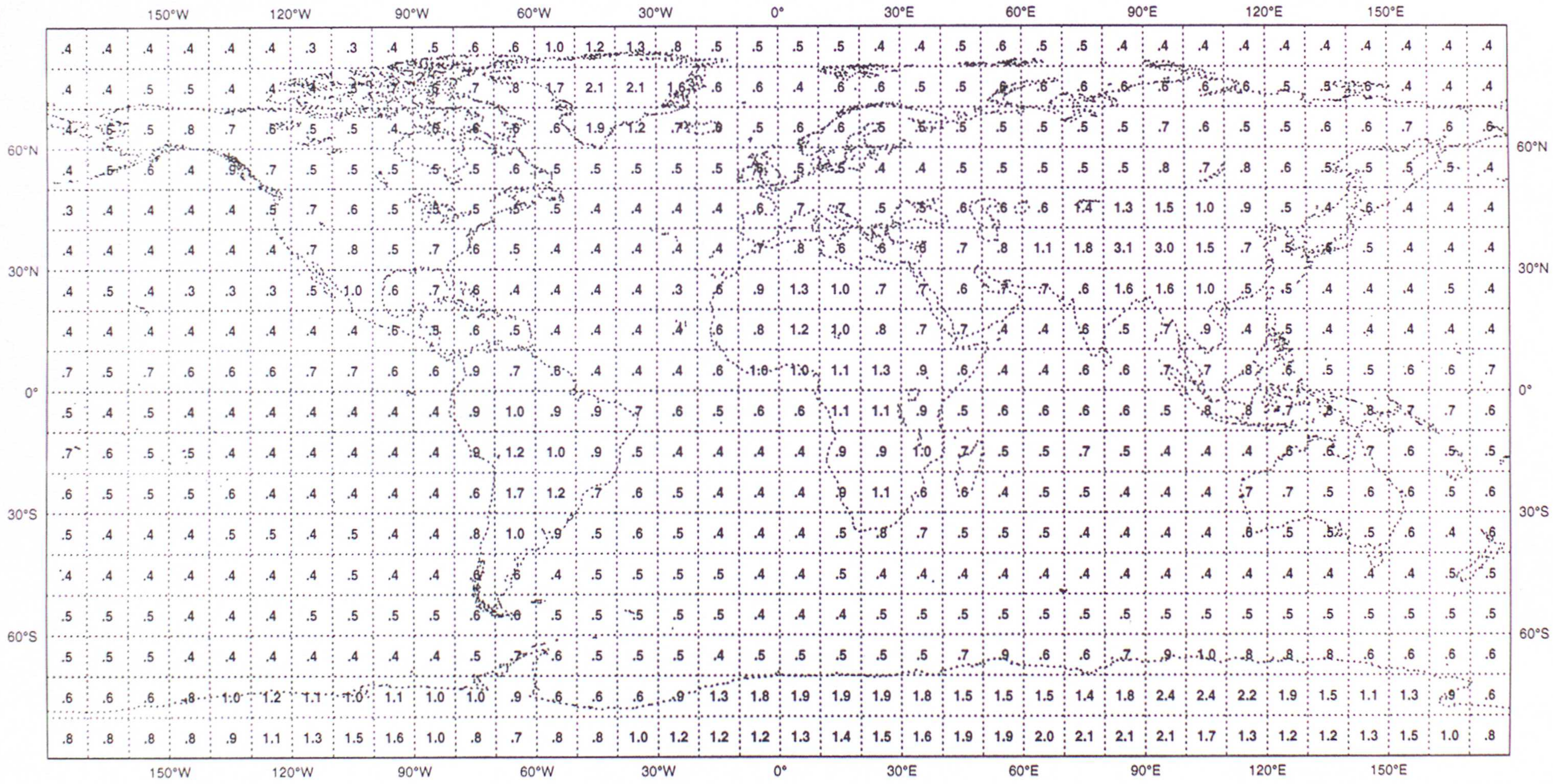

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.4 .4 .4 .4 .4 .4 .3 .3 .4 .5 .6 .6 1.0 1.2 1.3 .8 .5 .5 .5 .5 .4 .4 .5 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .5 .5 .4 .4 .4 .3 .7 .5 .7 .8 1.7 2.1 2.1 1.6 .6 .6 .4 .6 .6 .5 .5 .6 .6 .6 .6 .6 .6 .6 .5 .5 .6 .4 .4 .4
.4 .5 .5 .8 .7 .6 .5 .5 .4 .6 .6 .6 .6 1.9 1.2 .7 .8 .5 .6 .6 .5 .5 .5 .5 .5 .5 .5 .7 .6 .5 .5 .6 .6 .7 .6 .6
.4 .5 .6 .4 .9 .7 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .6 .5 .5 .4 .4 .5 .5 .5 .5 .5 .8 .7 .8 .6 .5 .5 .5 .5 .4
.3 .4 .4 .4 .4 .5 .7 .6 .5 .5 .5 .5 .5 .4 .4 .4 .4 .6 .7 .7 .5 .5 .6 .6 .6 1.4 1.3 1.5 1.0 .9 .5 .4 .6 .4 .4 .4
.4 .4 .4 .4 .4 .4 .7 .8 .5 .7 .6 .5 .4 .4 .4 .4 .4 .7 .8 .6 .6 .6 .7 .8 1.1 1.8 3.1 3.0 1.5 .7 .5 .6 .5 .4 .4 .4
.4 .5 .4 .3 .3 .3 .5 1.0 .6 .7 .6 .4 .4 .4 .4 .3 .6 .9 1.3 1.0 .7 .7 .6 .7 .7 .6 1.6 1.6 1.0 .5 .5 .4 .4 .4 .5 .4
.4 .4 .4 .4 .4 .4 .4 .4 .5 .3 .6 .5 .4 .4 .4 .4 .6 .8 1.2 1.0 .8 .7 .7 .4 .4 .6 .5 .7 .9 .4 .5 .4 .4 .4 .4 .4
.7 .5 .7 .6 .6 .6 .7 .7 .6 .6 .9 .7 .8 .4 .4 .4 .6 1.0 1.0 1.1 1.3 .9 .6 .4 .4 .6 .6 .7 .7 .8 .6 .5 .5 .6 .6 .7
.5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .9 1.0 .9 .9 .7 .6 .5 .6 .6 1.1 1.1 .9 .5 .6 .6 .6 .6 .5 .8 .8 .7 .8 .8 .7 .7 .6
.7 .6 .5 .5 .4 .4 .4 .4 .4 .4 .9 1.2 1.0 .9 .5 .4 .4 .4 .4 .9 .9 1.0 .7 .5 .5 .7 .5 .4 .4 .4 .6 .6 .7 .6 .5 .5
.6 .5 .5 .5 .6 .4 .4 .4 .4 .4 .6 1.7 1.2 .7 .6 .5 .4 .4 .4 .9 1.1 .6 .6 .4 .5 .5 .4 .4 .4 .7 .7 .5 .6 .6 .5 .6
.5 .4 .4 .4 .5 .5 .4 .5 .4 .4 .8 1.0 .9 .5 .6 .5 .4 .4 .4 .5 .8 .7 .5 .5 .5 .4 .4 .4 .4 .6 .5 .5 .5 .6 .4 .6
.4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .6 .6 .4 .5 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5
.5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .6 .6 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .7 .6 .5 .5 .5 .4 .5 .5 .5 .5 .5 .7 .9 .6 .6 .7 .9 1.0 .8 .8 .8 .6 .6 .6 .6
.6 .6 .6 .8 1.0 1.2 1.1 1.0 1.1 1.0 1.0 .9 .6 .6 .6 .9 1.3 1.8 1.9 1.9 1.9 1.8 1.5 1.5 1.5 1.4 1.8 2.4 2.4 2.2 1.9 1.5 1.1 1.3 .9 .6
.8 .8 .8 .8 .9 1.1 1.3 1.5 1.6 1.0 .8 .7 .8 .8 1.0 1.2 1.2 1.2 1.3 1.4 1.5 1.6 1.9 1.9 2.0 2.1 2.1 2.1 1.7 1.3 1.2 1.2 1.3 1.5 1.0 .8

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

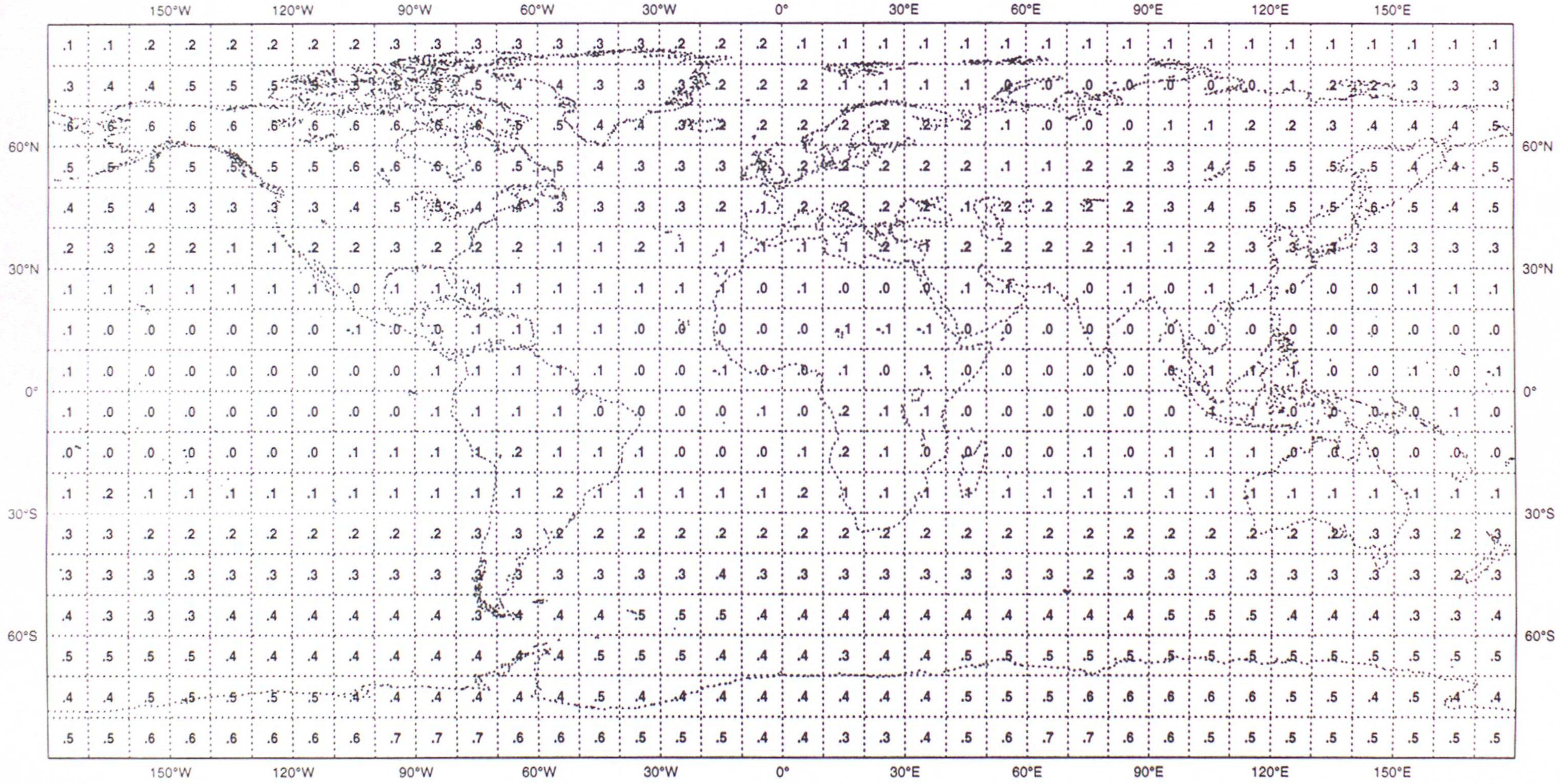

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

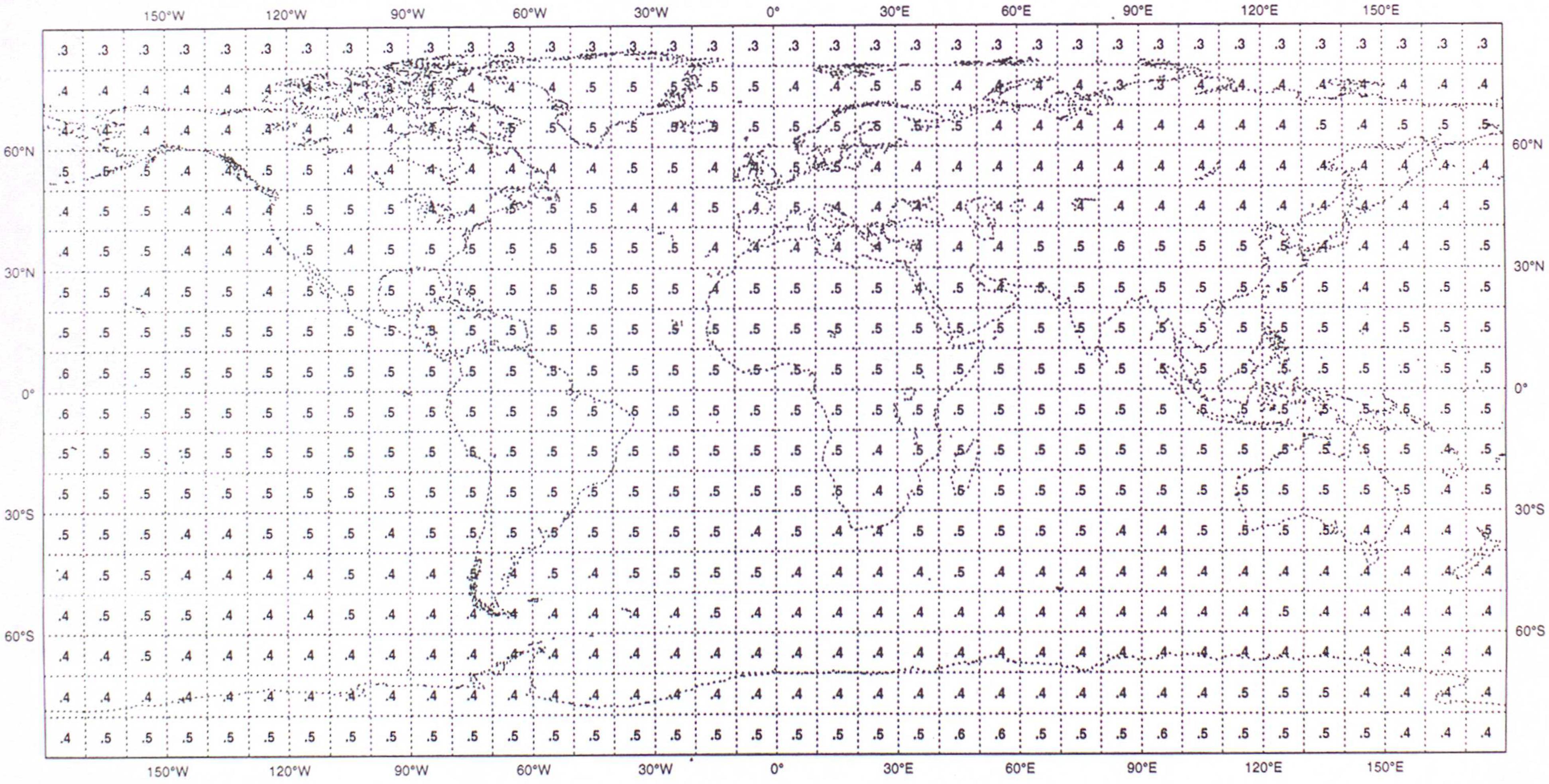

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

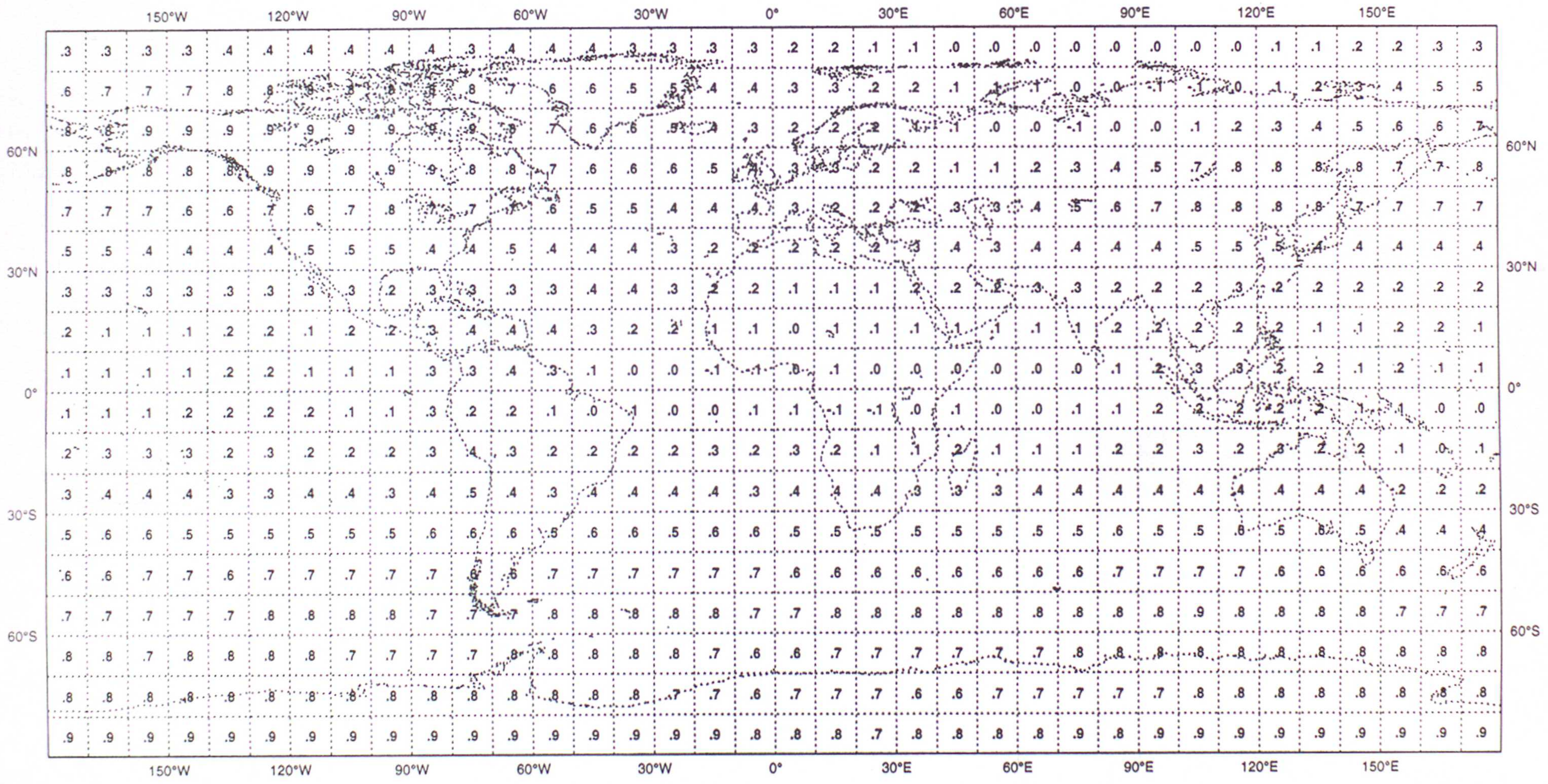

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

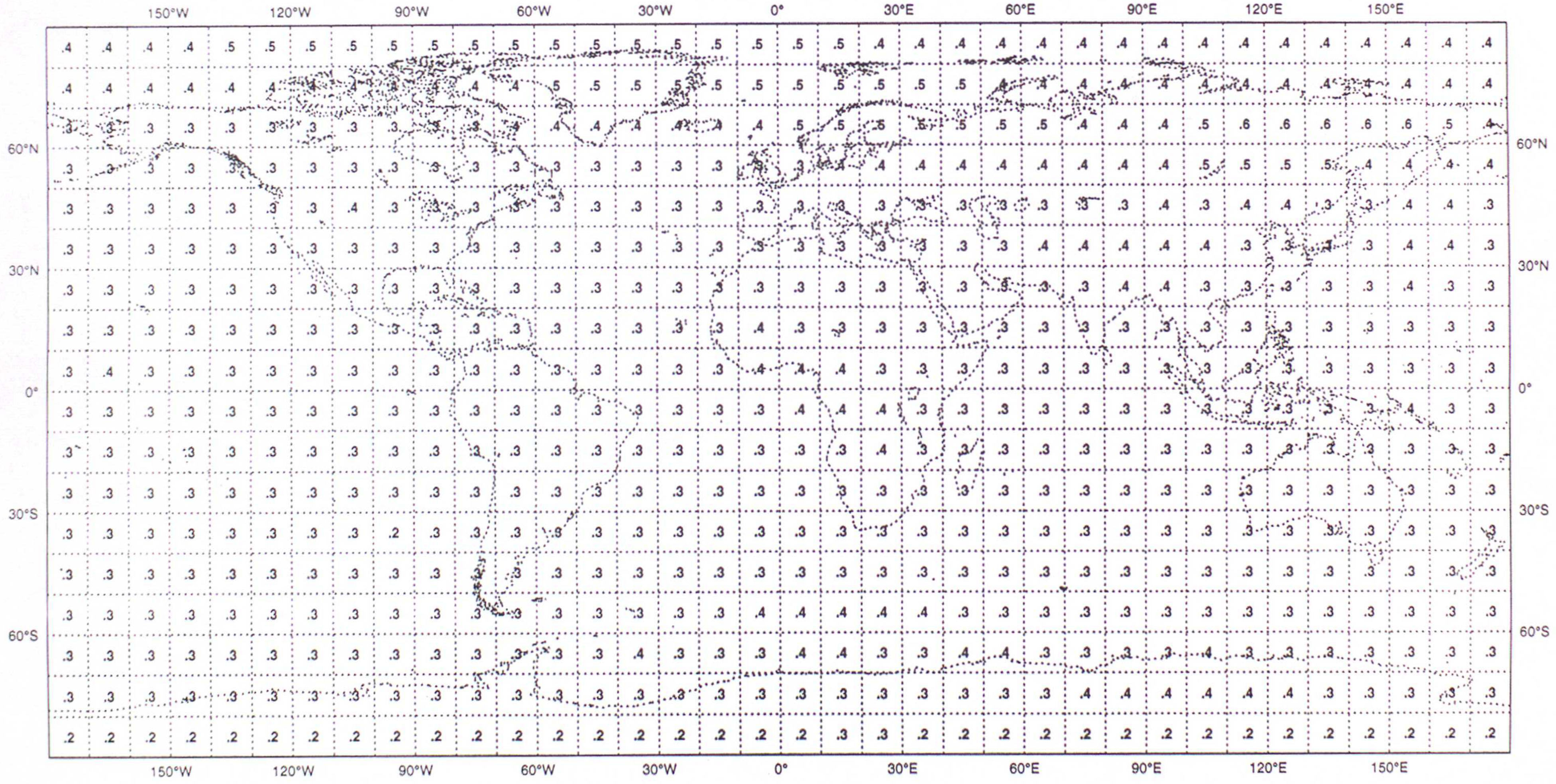
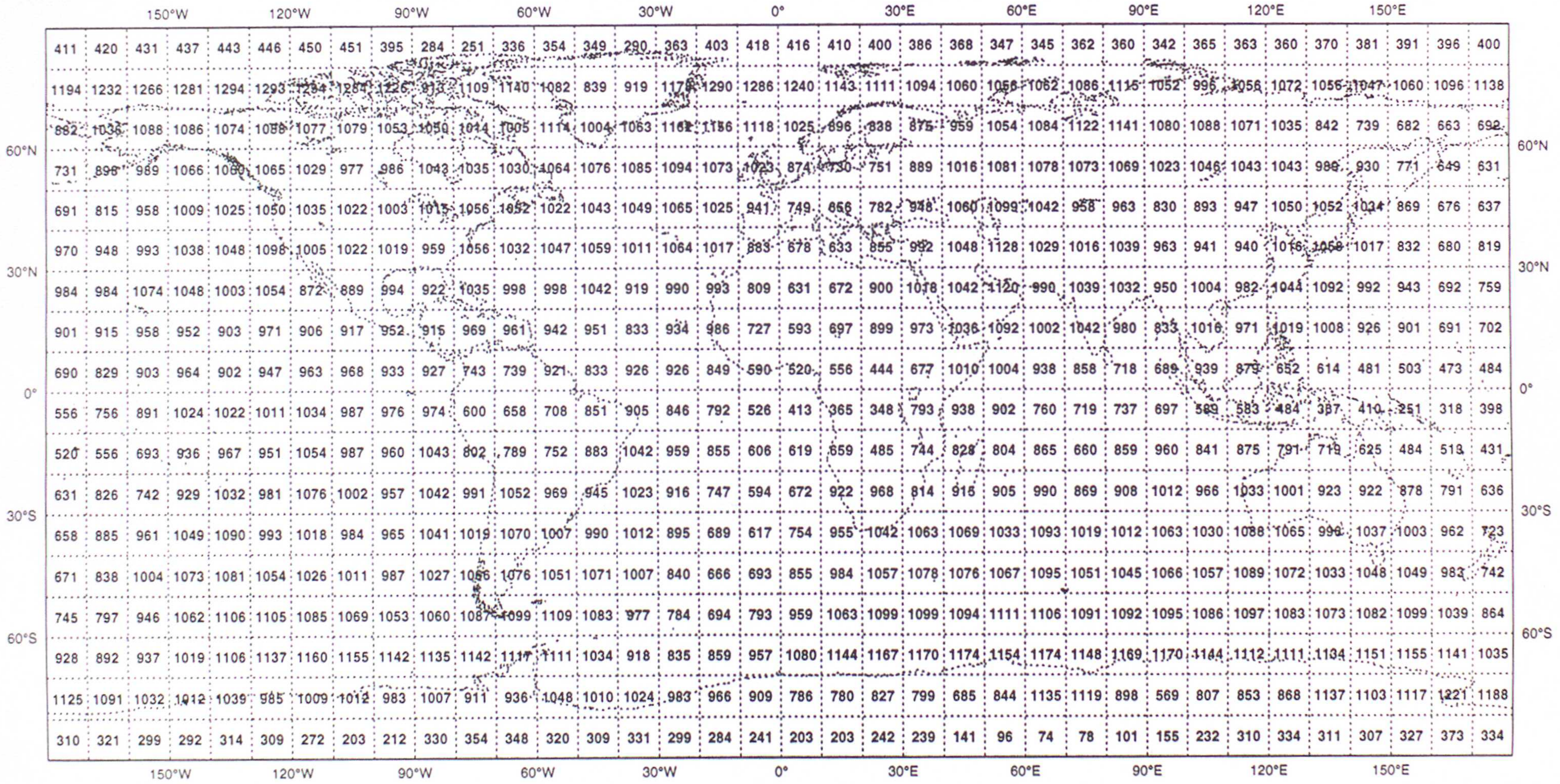

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 40. ATOVS mean daily count. MARCH 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 566638



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 411 | 420 | 431 | 437 | 443 | 446 | 450 | 451 | 395 | 284 | 251 | 336 | 354 | 349 | 290 | 363 | 403 | 418 | 416 | 410 | 400 | 386 | 368 | 347 | 345 | 362 | 360 | 342 | 365 | 363 | 360 | 370 | 381 | 391 | 396 | 400 |
| 1194 | 1232 | 1266 | 1281 | 1294 | 1293 | 1284 | 1284 | 1226 | 913 | 1109 | 1140 | 1082 | 839 | 919 | 1178 | 1290 | 1286 | 1240 | 1143 | 1111 | 1094 | 1060 | 1056 | 1062 | 1086 | 1115 | 1052 | 996 | 1056 | 1072 | 1056 | 1047 | 1060 | 1096 | 1138 |
| 882 | 1036 | 1088 | 1086 | 1074 | 1088 | 1077 | 1079 | 1053 | 1050 | 1014 | 1005 | 1114 | 1004 | 1063 | 1162 | 1156 | 1118 | 1025 | 896 | 838 | 875 | 959 | 1054 | 1084 | 1122 | 1141 | 1080 | 1088 | 1071 | 1035 | 842 | 739 | 682 | 663 | 692 |
| 731 | 898 | 989 | 1066 | 1060 | 1065 | 1029 | 977 | 986 | 1043 | 1035 | 1030 | 1064 | 1076 | 1085 | 1094 | 1073 | 1023 | 874 | 730 | 751 | 889 | 1016 | 1081 | 1078 | 1073 | 1069 | 1023 | 1046 | 1043 | 1043 | 989 | 930 | 771 | 649 | 631 |
| 691 | 815 | 958 | 1009 | 1025 | 1050 | 1035 | 1022 | 1003 | 1015 | 1056 | 1052 | 1022 | 1043 | 1049 | 1065 | 1025 | 941 | 749 | 656 | 782 | 948 | 1060 | 1099 | 1042 | 958 | 963 | 830 | 893 | 947 | 1050 | 1052 | 1034 | 869 | 676 | 637 |
| 970 | 948 | 993 | 1038 | 1048 | 1098 | 1005 | 1022 | 1019 | 959 | 1056 | 1032 | 1047 | 1059 | 1011 | 1064 | 1017 | 883 | 678 | 633 | 855 | 992 | 1048 | 1128 | 1029 | 1016 | 1039 | 963 | 941 | 940 | 1016 | 1058 | 1017 | 832 | 680 | 819 |
| 984 | 984 | 1074 | 1048 | 1003 | 1054 | 872 | 889 | 994 | 922 | 1035 | 998 | 998 | 1042 | 919 | 990 | 993 | 809 | 631 | 672 | 900 | 1018 | 1042 | 1120 | 990 | 1039 | 1032 | 950 | 1004 | 982 | 1044 | 1092 | 992 | 943 | 692 | 759 |
| 901 | 915 | 958 | 952 | 903 | 971 | 906 | 917 | 952 | 915 | 969 | 961 | 942 | 951 | 833 | 934 | 986 | 727 | 593 | 697 | 899 | 973 | 1036 | 1092 | 1002 | 1042 | 980 | 833 | 1016 | 971 | 1019 | 1008 | 926 | 901 | 691 | 702 |
| 690 | 829 | 903 | 964 | 902 | 947 | 963 | 968 | 933 | 927 | 743 | 739 | 921 | 833 | 926 | 926 | 849 | 590 | 520 | 556 | 444 | 677 | 1010 | 1004 | 938 | 858 | 718 | 689 | 939 | 879 | 652 | 614 | 481 | 503 | 473 | 484 |
| 556 | 756 | 891 | 1024 | 1022 | 1011 | 1034 | 987 | 976 | 974 | 600 | 658 | 708 | 851 | 905 | 846 | 792 | 526 | 413 | 365 | 348 | 793 | 938 | 902 | 760 | 719 | 737 | 697 | 589 | 583 | 484 | 387 | 410 | 251 | 318 | 398 |
| 520 | 556 | 693 | 936 | 967 | 951 | 1054 | 987 | 960 | 1043 | 802 | 789 | 752 | 883 | 1042 | 959 | 855 | 606 | 619 | 659 | 485 | 744 | 828 | 804 | 865 | 660 | 859 | 960 | 841 | 875 | 791 | 719 | 625 | 484 | 513 | 431 |
| 631 | 826 | 742 | 929 | 1032 | 981 | 1076 | 1002 | 957 | 1042 | 991 | 1052 | 969 | 945 | 1023 | 916 | 747 | 594 | 672 | 922 | 968 | 814 | 916 | 905 | 990 | 869 | 908 | 1012 | 966 | 1033 | 1001 | 923 | 922 | 878 | 791 | 636 |
| 658 | 885 | 961 | 1049 | 1090 | 993 | 1018 | 984 | 965 | 1041 | 1019 | 1070 | 1007 | 990 | 1012 | 895 | 689 | 617 | 754 | 955 | 1042 | 1063 | 1069 | 1033 | 1093 | 1019 | 1012 | 1063 | 1030 | 1088 | 1065 | 996 | 1037 | 1003 | 962 | 723 |
| 671 | 838 | 1004 | 1073 | 1081 | 1054 | 1026 | 1011 | 987 | 1027 | 1066 | 1076 | 1051 | 1071 | 1007 | 840 | 666 | 693 | 855 | 984 | 1057 | 1078 | 1076 | 1067 | 1095 | 1051 | 1045 | 1066 | 1057 | 1089 | 1072 | 1033 | 1048 | 1049 | 983 | 742 |
| 745 | 797 | 946 | 1062 | 1106 | 1105 | 1085 | 1069 | 1053 | 1060 | 1087 | 1099 | 1109 | 1083 | 977 | 784 | 694 | 793 | 959 | 1063 | 1099 | 1099 | 1094 | 1111 | 1106 | 1091 | 1092 | 1095 | 1086 | 1097 | 1083 | 1073 | 1082 | 1099 | 1039 | 864 |
| 928 | 892 | 937 | 1019 | 1106 | 1137 | 1160 | 1155 | 1142 | 1135 | 1142 | 1117 | 1111 | 1034 | 918 | 835 | 859 | 957 | 1080 | 1144 | 1167 | 1170 | 1174 | 1154 | 1174 | 1148 | 1169 | 1170 | 1144 | 1112 | 1111 | 1134 | 1151 | 1155 | 1141 | 1035 |
| 1125 | 1091 | 1032 | 1012 | 1039 | 985 | 1009 | 1012 | 983 | 1007 | 911 | 936 | 1048 | 1010 | 1024 | 983 | 966 | 909 | 786 | 780 | 827 | 799 | 685 | 844 | 1135 | 1119 | 898 | 569 | 807 | 853 | 868 | 1137 | 1103 | 1117 | 1221 | 1188 |
| 310 | 321 | 299 | 292 | 314 | 309 | 272 | 203 | 212 | 330 | 354 | 348 | 320 | 309 | 331 | 299 | 284 | 241 | 203 | 203 | 242 | 239 | 141 | 96 | 74 | 78 | 101 | 155 | 232 | 310 | 334 | 311 | 307 | 327 | 373 | 334 |

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations

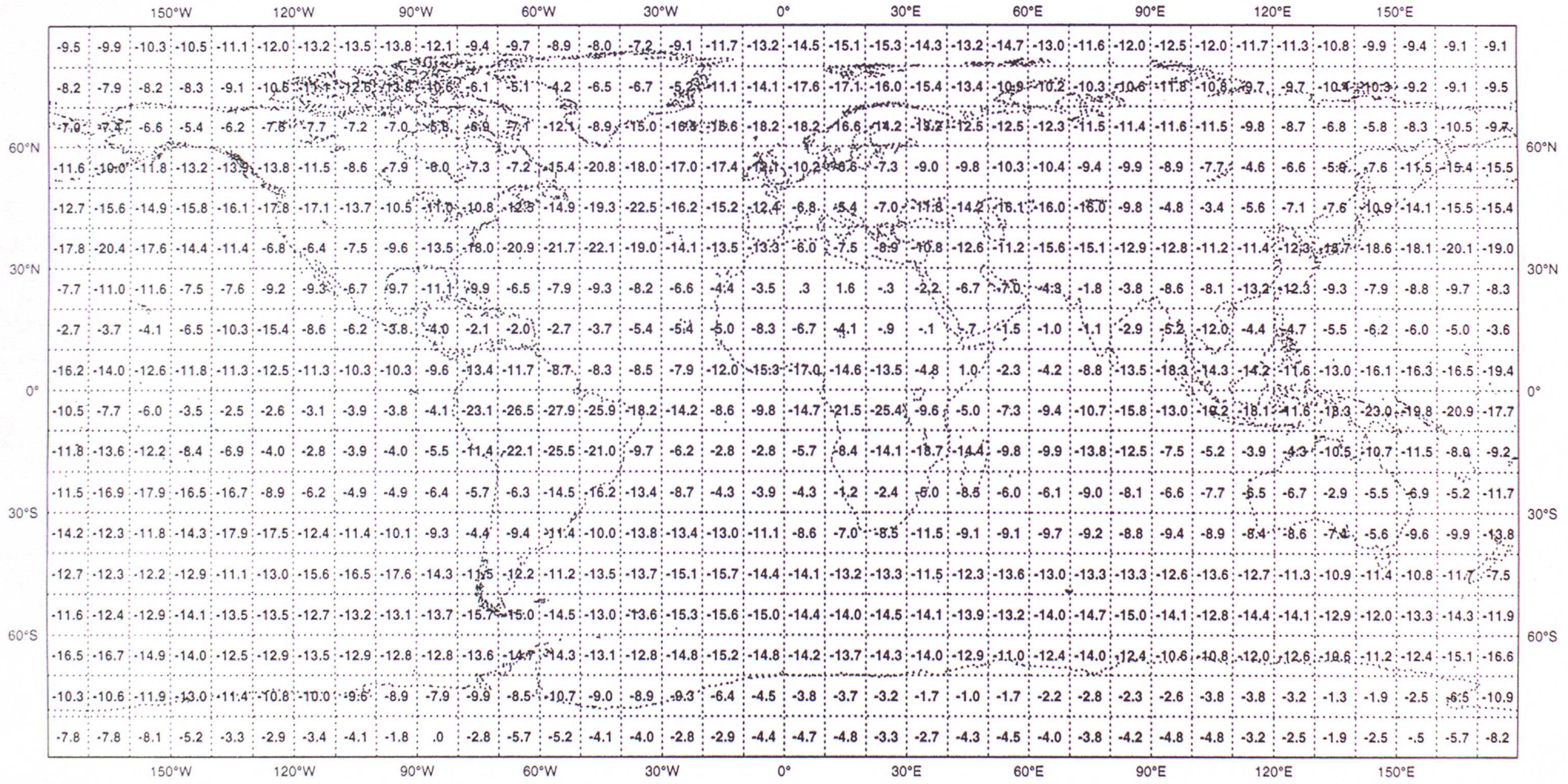
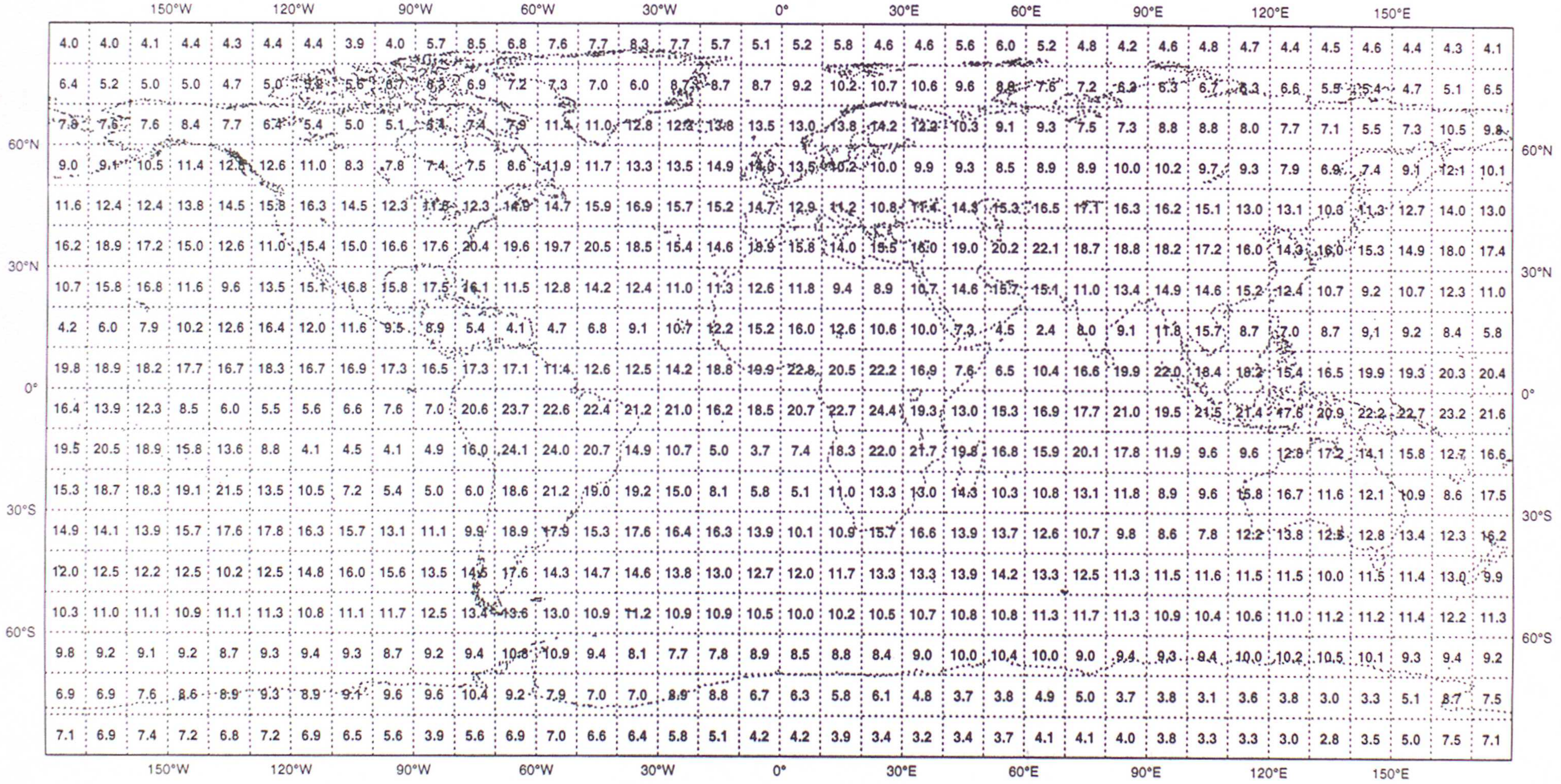

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-9.5 -9.9 -10.3 -10.5 -11.1 -12.0 -13.2 -13.5 -13.8 -12.1 -9.4 -9.7 -8.9 -8.0 -7.2 -9.1 -11.7 -13.2 -14.5 -15.1 -15.3 -14.3 -13.2 -14.7 -13.0 -11.6 -12.0 -12.5 -12.0 -11.7 -11.3 -10.8 -9.9 -9.4 -9.1 -9.1
-8.2 -7.9 -8.2 -8.3 -9.1 -10.6 -11.1 -12.6 -13.8 -10.6 -6.1 -5.1 -4.2 -6.5 -6.7 -5.2 -11.1 -14.1 -17.6 -17.1 -16.0 -15.4 -13.4 -10.9 -10.2 -10.3 -10.6 -11.8 -10.8 -9.7 -9.7 -10.4 -10.3 -9.2 -9.1 -9.5
-7.0 -7.4 -6.6 -5.4 -6.2 -7.8 -7.7 -7.2 -7.0 -5.8 -6.9 -7.1 -12.1 -8.9 -15.0 -16.8 -15.6 -18.2 -18.2 -16.6 -14.2 -13.2 -12.5 -12.5 -12.3 -11.5 -11.4 -11.6 -11.5 -9.8 -8.7 -6.8 -5.8 -8.3 -10.5 -9.7
-11.6 -10.0 -11.8 -13.2 -13.9 -13.8 -11.5 -8.6 -7.9 -8.0 -7.3 -7.2 -15.4 -20.8 -18.0 -17.0 -17.4 -12.1 -10.2 -8.6 -7.3 -9.0 -9.8 -10.3 -10.4 -9.4 -9.9 -8.9 -7.7 -4.6 -6.6 -5.9 -7.6 -11.5 -15.4 -15.5
-12.7 -15.6 -14.9 -15.8 -16.1 -17.8 -17.1 -13.7 -10.5 -11.0 -10.8 -12.5 -14.9 -19.3 -22.5 -16.2 -15.2 -12.4 -6.8 -5.4 -7.0 -11.8 -14.2 -16.1 -16.0 -16.0 -9.8 -4.8 -3.4 -5.6 -7.1 -7.6 -10.9 -14.1 -15.5 -15.4
-17.8 -20.4 -17.6 -14.4 -11.4 -6.8 -6.4 -7.5 -9.6 -13.5 -18.0 -20.9 -21.7 -22.1 -19.0 -14.1 -13.5 -13.3 -6.0 -7.5 -8.9 -10.8 -12.6 -11.2 -15.6 -15.1 -12.9 -12.8 -11.2 -11.4 -12.3 -18.7 -18.6 -18.1 -20.1 -19.0
-7.7 -11.0 -11.6 -7.5 -7.6 -9.2 -9.3 -6.7 -9.7 -11.1 -9.9 -6.5 -7.9 -9.3 -8.2 -6.6 -4.4 -3.5 .3 1.6 -.3 -2.2 -6.7 -7.0 -4.3 -1.8 -3.8 -8.6 -8.1 -13.2 -12.3 -9.3 -7.9 -8.8 -9.7 -8.3
-2.7 -3.7 -4.1 -6.5 -10.3 -15.4 -8.6 -6.2 -3.8 -4.0 -2.1 -2.0 -2.7 -3.7 -5.4 -5.4 -5.0 -8.3 -6.7 -4.1 -.9 -.1 -.7 -1.5 -1.0 -1.1 -2.9 -5.2 -12.0 -4.4 -4.7 -5.5 -6.2 -6.0 -5.0 -3.6
-16.2 -14.0 -12.6 -11.8 -11.3 -12.5 -11.3 -10.3 -10.3 -9.6 -13.4 -11.7 -8.7 -8.3 -8.5 -7.9 -12.0 -15.3 -17.0 -14.6 -13.5 -4.8 1.0 -2.3 -4.2 -8.8 -13.5 -18.3 -14.3 -14.2 -11.6 -13.0 -16.1 -16.3 -16.5 -19.4
-10.5 -7.7 -6.0 -3.5 -2.5 -2.6 -3.1 -3.9 -3.8 -4.1 -23.1 -26.5 -27.9 -25.9 -18.2 -14.2 -8.6 -9.8 -14.7 -21.5 -25.4 -9.6 -5.0 -7.3 -9.4 -10.7 -15.8 -13.0 -10.2 -18.1 -11.6 -18.3 -23.0 -19.8 -20.9 -17.7
-11.8 -13.6 -12.2 -8.4 -6.9 -4.0 -2.8 -3.9 -4.0 -5.5 -11.4 -22.1 -25.5 -21.0 -9.7 -6.2 -2.8 -2.8 -5.7 -8.4 -14.1 -18.7 -14.4 -9.8 -9.9 -13.8 -12.5 -7.5 -5.2 -3.9 -4.3 -10.5 -10.7 -11.5 -8.9 -9.2
-11.5 -16.9 -17.9 -16.5 -16.7 -8.9 -6.2 -4.9 -4.9 -6.4 -5.7 -6.3 -14.5 -16.2 -13.4 -8.7 -4.3 -3.9 -4.3 -1.2 -2.4 -6.0 -8.5 -6.0 -6.1 -9.0 -8.1 -6.6 -7.7 -6.5 -6.7 -2.9 -5.5 -6.9 -5.2 -11.7
-14.2 -12.3 -11.8 -14.3 -17.9 -17.5 -12.4 -11.4 -10.1 -9.3 -4.4 -9.4 -11.4 -10.0 -13.8 -13.4 -13.0 -11.1 -8.6 -7.0 -8.5 -11.5 -9.1 -9.1 -9.7 -9.2 -8.8 -9.4 -8.9 -8.4 -8.6 -7.4 -5.6 -9.6 -9.9 -13.8
-12.7 -12.3 -12.2 -12.9 -11.1 -13.0 -15.6 -16.5 -17.6 -14.3 -11.5 -12.2 -11.2 -13.5 -13.7 -15.1 -15.7 -14.4 -14.1 -13.2 -13.3 -11.5 -12.3 -13.6 -13.0 -13.3 -13.3 -12.6 -13.6 -12.7 -11.3 -10.9 -11.4 -10.8 -11.7 -7.5
-11.6 -12.4 -12.9 -14.1 -13.5 -13.5 -12.7 -13.2 -13.1 -13.7 -15.7 -15.0 -14.5 -13.0 -13.6 -15.3 -15.6 -15.0 -14.4 -14.0 -14.5 -14.1 -13.9 -13.2 -14.0 -14.7 -15.0 -14.1 -12.8 -14.4 -14.1 -12.9 -12.0 -13.3 -14.3 -11.9
-16.5 -16.7 -14.9 -14.0 -12.5 -12.9 -13.5 -12.9 -12.8 -12.8 -13.6 -14.7 -14.3 -13.1 -12.8 -14.8 -15.2 -14.8 -14.2 -13.7 -14.3 -14.0 -12.9 -11.0 -12.4 -14.0 -12.4 -10.6 -10.8 -12.0 -12.6 -10.6 -11.2 -12.4 -15.1 -16.6
-10.3 -10.6 -11.9 -13.0 -11.4 -10.8 -10.0 -9.6 -8.9 -7.9 -9.9 -8.5 -10.7 -9.0 -8.9 -9.3 -6.4 -4.5 -3.8 -3.7 -3.2 -1.7 -1.0 -1.7 -2.2 -2.8 -2.3 -2.6 -3.8 -3.8 -3.2 -1.3 -1.9 -2.5 -6.5 -10.9
-7.8 -7.8 -8.1 -5.2 -3.3 -2.9 -3.4 -4.1 -1.8 .0 -2.8 -5.7 -5.2 -4.1 -4.0 -2.8 -2.9 -4.4 -4.7 -4.8 -3.3 -2.7 -4.3 -4.5 -4.0 -3.8 -4.2 -4.8 -4.8 -3.2 -2.5 -1.9 -2.5 -.5 -5.7 -8.2

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.0 | 4.0 | 4.1 | 4.4 | 4.3 | 4.4 | 4.4 | 3.9 | 4.0 | 5.7 | 8.5 | 6.8 | 7.6 | 7.7 | 8.3 | 7.7 | 5.7 | 5.1 | 5.2 | 5.8 | 4.6 | 4.6 | 5.6 | 6.0 | 5.2 | 4.8 | 4.2 | 4.6 | 4.8 | 4.7 | 4.4 | 4.5 | 4.6 | 4.4 | 4.3 | 4.1 |
| 6.4 | 5.2 | 5.0 | 5.0 | 4.7 | 5.0 | 5.8 | 5.6 | 8.7 | 8.3 | 6.9 | 7.2 | 7.3 | 7.0 | 6.0 | 8.7 | 8.7 | 8.7 | 9.2 | 10.2 | 10.7 | 10.6 | 9.6 | 8.8 | 7.6 | 7.2 | 6.3 | 6.3 | 6.7 | 6.3 | 6.6 | 5.5 | 5.4 | 4.7 | 5.1 | 6.5 |
| 7.8 | 7.6 | 7.6 | 8.4 | 7.7 | 6.4 | 5.4 | 5.0 | 5.1 | 5.4 | 7.4 | 7.9 | 11.4 | 11.0 | 12.8 | 12.8 | 13.8 | 13.5 | 13.0 | 13.8 | 14.2 | 12.2 | 10.3 | 9.1 | 9.3 | 7.5 | 7.3 | 8.8 | 8.8 | 8.0 | 7.7 | 7.1 | 5.5 | 7.3 | 10.5 | 9.8 |
| 9.0 | 9.1 | 10.5 | 11.4 | 12.8 | 12.6 | 11.0 | 8.3 | 7.8 | 7.4 | 7.5 | 8.6 | 11.9 | 11.7 | 13.3 | 13.5 | 14.9 | 14.0 | 13.5 | 10.2 | 10.0 | 9.9 | 9.3 | 8.5 | 8.9 | 8.9 | 10.0 | 10.2 | 9.7 | 9.3 | 7.9 | 6.9 | 7.4 | 9.1 | 12.1 | 10.1 |
| 11.6 | 12.4 | 12.4 | 13.8 | 14.5 | 15.8 | 16.3 | 14.5 | 12.3 | 11.5 | 12.3 | 14.9 | 14.7 | 15.9 | 16.9 | 15.7 | 15.2 | 14.7 | 12.9 | 11.2 | 10.8 | 11.4 | 14.3 | 15.3 | 16.5 | 17.1 | 16.3 | 16.2 | 15.1 | 13.0 | 13.1 | 10.8 | 11.3 | 12.7 | 14.0 | 13.0 |
| 16.2 | 18.9 | 17.2 | 15.0 | 12.6 | 11.0 | 15.4 | 15.0 | 16.6 | 17.6 | 20.4 | 19.6 | 19.7 | 20.5 | 18.5 | 15.4 | 14.6 | 18.9 | 15.8 | 14.0 | 15.5 | 16.0 | 19.0 | 20.2 | 22.1 | 18.7 | 18.8 | 18.2 | 17.2 | 16.0 | 14.3 | 16.0 | 15.3 | 14.9 | 18.0 | 17.4 |
| 10.7 | 15.8 | 16.8 | 11.6 | 9.6 | 13.5 | 15.1 | 16.8 | 15.8 | 17.5 | 16.1 | 11.5 | 12.8 | 14.2 | 12.4 | 11.0 | 11.3 | 12.6 | 11.8 | 9.4 | 8.9 | 10.7 | 14.6 | 15.7 | 15.1 | 11.0 | 13.4 | 14.9 | 14.6 | 15.2 | 12.4 | 10.7 | 9.2 | 10.7 | 12.3 | 11.0 |
| 4.2 | 6.0 | 7.9 | 10.2 | 12.6 | 16.4 | 12.0 | 11.6 | 9.5 | 8.9 | 5.4 | 4.1 | 4.7 | 6.8 | 9.1 | 10.7 | 12.2 | 15.2 | 16.0 | 12.6 | 10.6 | 10.0 | 7.3 | 4.5 | 2.4 | 8.0 | 9.1 | 11.8 | 15.7 | 8.7 | 7.0 | 8.7 | 9.1 | 9.2 | 8.4 | 5.8 |
| 19.8 | 18.9 | 18.2 | 17.7 | 16.7 | 18.3 | 16.7 | 16.9 | 17.3 | 16.5 | 17.3 | 17.1 | 11.4 | 12.6 | 12.5 | 14.2 | 18.8 | 19.9 | 22.8 | 20.5 | 22.2 | 16.9 | 7.6 | 6.5 | 10.4 | 16.6 | 19.9 | 22.0 | 18.4 | 18.2 | 15.4 | 16.5 | 19.9 | 19.3 | 20.3 | 20.4 |
| 16.4 | 13.9 | 12.3 | 8.5 | 6.0 | 5.5 | 5.6 | 6.6 | 7.6 | 7.0 | 20.6 | 23.7 | 22.6 | 22.4 | 21.2 | 21.0 | 16.2 | 18.5 | 20.7 | 22.7 | 24.4 | 19.3 | 13.0 | 15.3 | 16.9 | 17.7 | 21.0 | 19.5 | 21.5 | 21.4 | 17.6 | 20.9 | 22.2 | 22.7 | 23.2 | 21.6 |
| 19.5 | 20.5 | 18.9 | 15.8 | 13.6 | 8.8 | 4.1 | 4.5 | 4.1 | 4.9 | 16.0 | 24.1 | 24.0 | 20.7 | 14.9 | 10.7 | 5.0 | 3.7 | 7.4 | 18.3 | 22.0 | 21.7 | 19.8 | 16.8 | 15.9 | 20.1 | 17.8 | 11.9 | 9.6 | 9.6 | 12.8 | 17.2 | 14.1 | 15.8 | 12.7 | 16.6 |
| 15.3 | 18.7 | 18.3 | 19.1 | 21.5 | 13.5 | 10.5 | 7.2 | 5.4 | 5.0 | 6.0 | 18.6 | 21.2 | 19.0 | 19.2 | 15.0 | 8.1 | 5.8 | 5.1 | 11.0 | 13.3 | 13.0 | 14.3 | 10.3 | 10.8 | 13.1 | 11.8 | 8.9 | 9.6 | 15.8 | 16.7 | 11.6 | 12.1 | 10.9 | 8.6 | 17.5 |
| 14.9 | 14.1 | 13.9 | 15.7 | 17.6 | 17.8 | 16.3 | 15.7 | 13.1 | 11.1 | 9.9 | 18.9 | 17.9 | 15.3 | 17.6 | 16.4 | 16.3 | 13.9 | 10.1 | 10.9 | 15.7 | 16.6 | 13.9 | 13.7 | 12.6 | 10.7 | 9.8 | 8.6 | 7.8 | 12.2 | 13.8 | 12.5 | 12.8 | 13.4 | 12.3 | 16.2 |
| 12.0 | 12.5 | 12.2 | 12.5 | 10.2 | 12.5 | 14.8 | 16.0 | 15.6 | 13.5 | 14.5 | 17.6 | 14.3 | 14.7 | 14.6 | 13.8 | 13.0 | 12.7 | 12.0 | 11.7 | 13.3 | 13.3 | 13.9 | 14.2 | 13.3 | 12.5 | 11.3 | 11.5 | 11.6 | 11.5 | 11.5 | 10.0 | 11.5 | 11.4 | 13.0 | 9.9 |
| 10.3 | 11.0 | 11.1 | 10.9 | 11.1 | 11.3 | 10.8 | 11.1 | 11.7 | 12.5 | 13.4 | 13.6 | 13.0 | 10.9 | 11.2 | 10.9 | 10.9 | 10.5 | 10.0 | 10.2 | 10.5 | 10.7 | 10.8 | 10.8 | 11.3 | 11.7 | 11.3 | 10.9 | 10.4 | 10.6 | 11.0 | 11.2 | 11.2 | 11.4 | 12.2 | 11.3 |
| 9.8 | 9.2 | 9.1 | 9.2 | 8.7 | 9.3 | 9.4 | 9.3 | 8.7 | 9.2 | 9.4 | 10.8 | 10.9 | 9.4 | 8.1 | 7.7 | 7.8 | 8.9 | 8.5 | 8.8 | 8.4 | 9.0 | 10.0 | 10.4 | 10.0 | 9.0 | 9.4 | 9.3 | 9.4 | 10.0 | 10.2 | 10.5 | 10.1 | 9.3 | 9.4 | 9.2 |
| 6.9 | 6.9 | 7.6 | 8.6 | 8.9 | 9.3 | 8.9 | 9.1 | 9.6 | 9.6 | 10.4 | 9.2 | 7.9 | 7.0 | 7.0 | 8.9 | 8.8 | 6.7 | 6.3 | 5.8 | 6.1 | 4.8 | 3.7 | 3.8 | 4.9 | 5.0 | 3.7 | 3.8 | 3.1 | 3.6 | 3.8 | 3.0 | 3.3 | 5.1 | 8.7 | 7.5 |
| 7.1 | 6.9 | 7.4 | 7.2 | 6.8 | 7.2 | 6.9 | 6.5 | 5.6 | 3.9 | 5.6 | 6.9 | 7.0 | 6.6 | 6.4 | 5.8 | 5.1 | 4.2 | 4.2 | 3.9 | 3.4 | 3.2 | 3.4 | 3.7 | 4.1 | 4.1 | 4.0 | 3.8 | 3.3 | 3.3 | 3.0 | 2.8 | 3.5 | 5.0 | 7.5 | 7.1 |

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

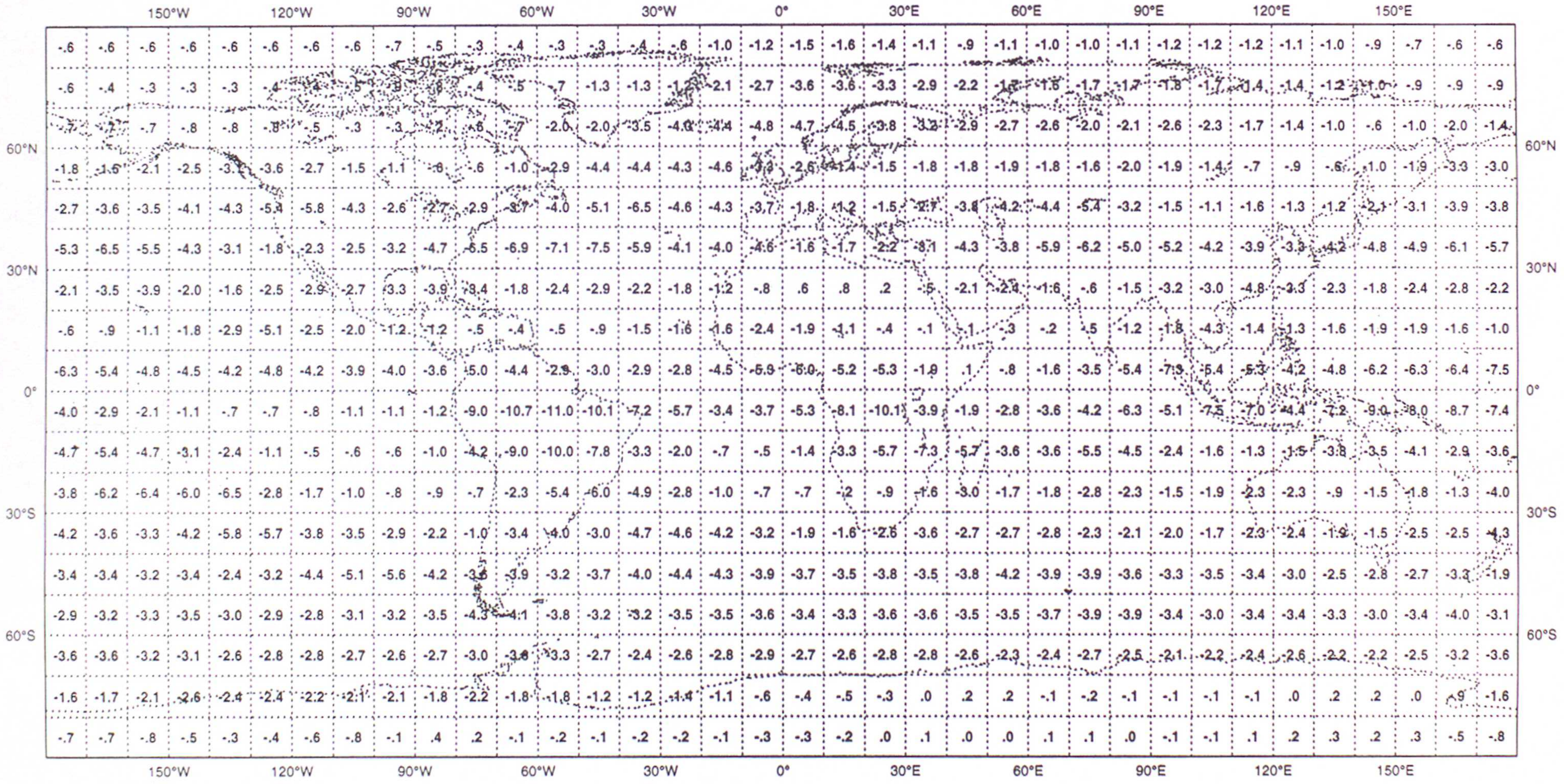
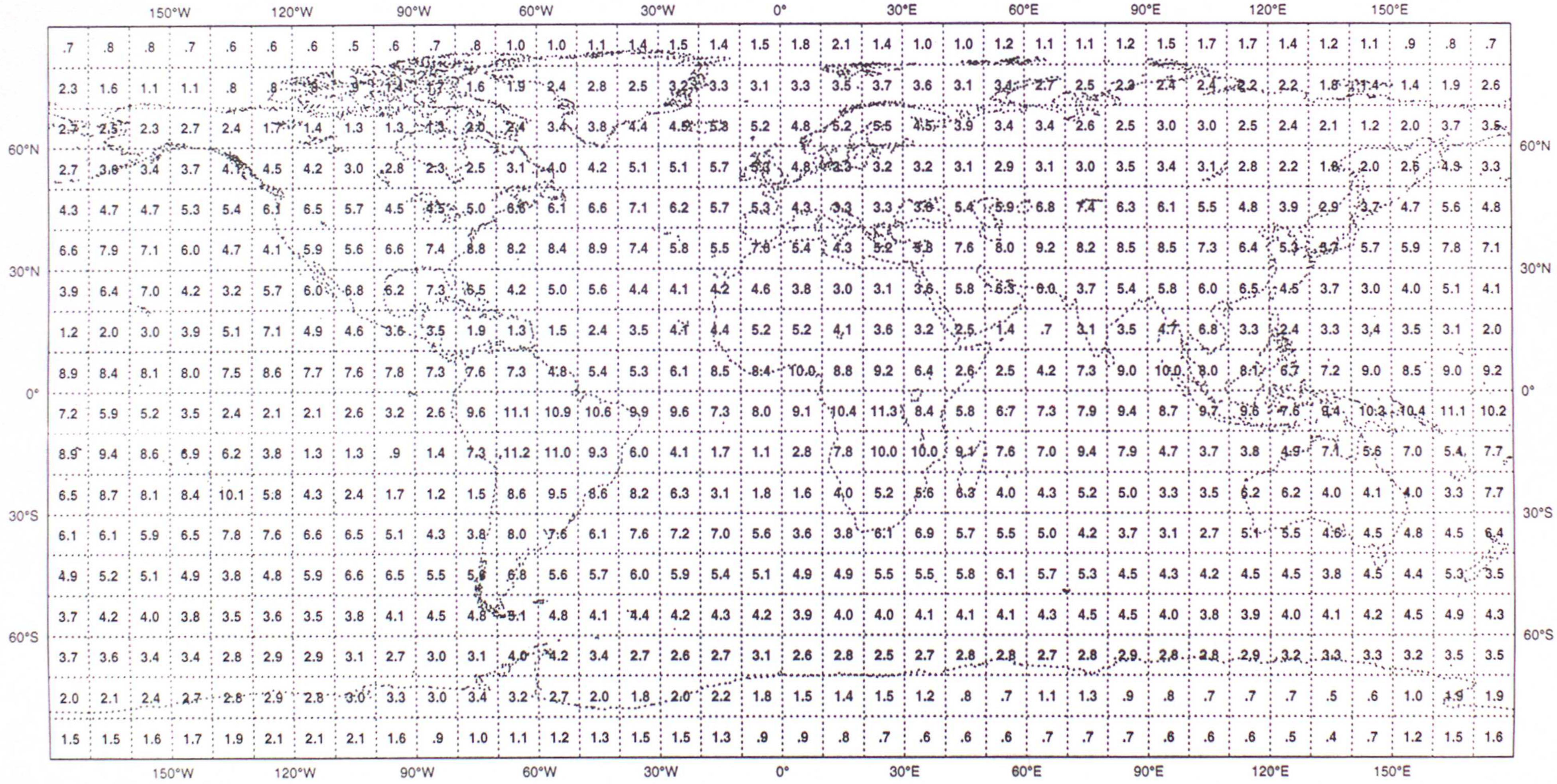

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.5 -.3 -.4 -.3 -.3 -.4 -.6 -1.0 -1.2 -1.5 -1.6 -1.4 -1.1 -.9 -1.1 -1.0 -1.0 -1.1 -1.2 -1.2 -1.2 -1.1 -1.0 -.9 -.7 -.6 -.6
-.6 -.4 -.3 -.3 -.3 -.4 -.4 -.5 -.8 -.8 -.4 -.5 -.7 -1.3 -1.3 -1.2 -2.1 -2.7 -3.6 -3.6 -3.3 -2.9 -2.2 -1.7 -1.6 -1.7 -1.7 -1.8 -1.7 -1.4 -1.4 -1.2 -1.0 -.9 -.9 -.9
-.7 -.7 -.7 -.8 -.8 -.8 -.5 -.3 -.3 -.2 -.6 -.7 -2.0 -2.0 -3.5 -4.0 -4.4 -4.8 -4.7 -4.5 -3.8 -3.2 -2.9 -2.7 -2.6 -2.0 -2.1 -2.6 -2.3 -1.7 -1.4 -1.0 -.6 -1.0 -2.0 -1.4
-1.8 -1.5 -2.1 -2.5 -3.1 -3.6 -2.7 -1.5 -1.1 -.8 -.6 -1.0 -2.9 -4.4 -4.4 -4.3 -4.6 -3.3 -2.6 -1.4 -1.5 -1.8 -1.8 -1.9 -1.8 -1.6 -2.0 -1.9 -1.4 -.7 -.9 -.6 -1.0 -1.9 -3.3 -3.0
-2.7 -3.6 -3.5 -4.1 -4.3 -5.4 -5.8 -4.3 -2.6 -2.7 -2.9 -3.7 -4.0 -5.1 -6.5 -4.6 -4.3 -3.7 -1.8 -1.2 -1.5 -2.7 -3.8 -4.2 -4.4 -5.4 -3.2 -1.5 -1.1 -1.6 -1.3 -1.2 -2.1 -3.1 -3.9 -3.8
-5.3 -6.5 -5.5 -4.3 -3.1 -1.8 -2.3 -2.5 -3.2 -4.7 -6.5 -6.9 -7.1 -7.5 -5.9 -4.1 -4.0 -4.6 -1.6 -1.7 -2.2 -8.1 -4.3 -3.8 -5.9 -6.2 -5.0 -5.2 -4.2 -3.9 -3.3 -4.2 -4.8 -4.9 -6.1 -5.7
-2.1 -3.5 -3.9 -2.0 -1.6 -2.5 -2.9 -2.7 -3.3 -3.9 -3.4 -1.8 -2.4 -2.9 -2.2 -1.8 -1.2 -.8 .6 .8 .2 -.5 -2.1 -2.4 -1.6 -.6 -1.5 -3.2 -3.0 -4.8 -3.3 -2.3 -1.8 -2.4 -2.8 -2.2
-.6 -.9 -1.1 -1.8 -2.9 -5.1 -2.5 -2.0 -1.2 -1.2 -.5 -.4 -.5 -.9 -1.5 -1.6 -1.6 -2.4 -1.9 -1.1 -.4 -.1 -.1 -.3 -.2 -.5 -1.2 -1.8 -4.3 -1.4 -1.3 -1.6 -1.9 -1.9 -1.6 -1.0
-6.3 -5.4 -4.8 -4.5 -4.2 -4.8 -4.2 -3.9 -4.0 -3.6 -5.0 -4.4 -2.9 -3.0 -2.9 -2.8 -4.5 -5.9 -6.0 -5.2 -5.3 -1.9 .1 -.8 -1.6 -3.5 -5.4 -7.3 -5.4 -5.3 -4.2 -4.8 -6.2 -6.3 -6.4 -7.5
-4.0 -2.9 -2.1 -1.1 -.7 -.7 -.8 -1.1 -1.1 -1.2 -9.0 -10.7 -11.0 -10.1 -7.2 -5.7 -3.4 -3.7 -5.3 -8.1 -10.1 -3.9 -1.9 -2.8 -3.6 -4.2 -6.3 -5.1 -7.5 -7.0 -4.4 -7.2 -9.0 -8.0 -8.7 -7.4
-4.7 -5.4 -4.7 -3.1 -2.4 -1.1 -.5 -.6 -.6 -1.0 -4.2 -9.0 -10.0 -7.8 -3.3 -2.0 -.7 -.5 -1.4 -3.3 -5.7 -7.3 -5.7 -3.6 -3.6 -5.5 -4.5 -2.4 -1.6 -1.3 -1.5 -3.8 -3.5 -4.1 -2.9 -3.6
-3.8 -6.2 -6.4 -6.0 -6.5 -2.8 -1.7 -1.0 -.8 -.9 -.7 -2.3 -5.4 -6.0 -4.9 -2.8 -1.0 -.7 -.7 -.2 -.9 -1.6 -3.0 -1.7 -1.8 -2.8 -2.3 -1.5 -1.9 -2.3 -2.3 -.9 -1.5 -1.8 -1.3 -4.0
-4.2 -3.6 -3.3 -4.2 -5.8 -5.7 -3.8 -3.5 -2.9 -2.2 -1.0 -3.4 -4.0 -3.0 -4.7 -4.6 -4.2 -3.2 -1.9 -1.6 -2.6 -3.6 -2.7 -2.7 -2.8 -2.3 -2.1 -2.0 -1.7 -2.3 -2.4 -1.9 -1.5 -2.5 -2.5 -4.3
-3.4 -3.4 -3.2 -3.4 -2.4 -3.2 -4.4 -5.1 -5.6 -4.2 -3.6 -3.9 -3.2 -3.7 -4.0 -4.4 -4.3 -3.9 -3.7 -3.5 -3.8 -3.5 -3.8 -4.2 -3.9 -3.9 -3.6 -3.3 -3.5 -3.4 -3.0 -2.5 -2.8 -2.7 -3.3 -1.9
-2.9 -3.2 -3.3 -3.5 -3.0 -2.9 -2.8 -3.1 -3.2 -3.5 -4.3 -4.1 -3.8 -3.2 -3.2 -3.5 -3.5 -3.6 -3.4 -3.3 -3.6 -3.6 -3.5 -3.5 -3.7 -3.9 -3.9 -3.4 -3.0 -3.4 -3.4 -3.3 -3.0 -3.4 -4.0 -3.1
-3.6 -3.6 -3.2 -3.1 -2.6 -2.8 -2.8 -2.7 -2.6 -2.7 -3.0 -3.6 -3.3 -2.7 -2.4 -2.6 -2.8 -2.9 -2.7 -2.6 -2.8 -2.8 -2.6 -2.3 -2.4 -2.7 -2.5 -2.1 -2.2 -2.4 -2.6 -2.2 -2.2 -2.5 -3.2 -3.6
-1.6 -1.7 -2.1 -2.6 -2.4 -2.4 -2.2 -2.1 -2.1 -1.8 -2.2 -1.8 -1.8 -1.2 -1.2 -1.4 -1.1 -.6 -.4 -.5 -.3 .0 .2 .2 -.1 -.2 -.1 -.1 -.1 -.1 .0 .2 .2 .0 -.9 -1.6
-.7 -.7 -.8 -.5 -.3 -.4 -.6 -.8 -.1 .4 .2 -.1 -.2 -.1 -.2 -.2 -.1 -.3 -.3 -.2 .0 .1 .0 .0 .1 .1 .0 -.1 -.1 .1 .2 .3 .2 .3 -.5 -.8

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .7 | .8 | .8 | .7 | .6 | .6 | .6 | .5 | .6 | .7 | .8 | 1.0 | 1.0 | 1.1 | 1.4 | 1.5 | 1.4 | 1.5 | 1.8 | 2.1 | 1.4 | 1.0 | 1.0 | 1.2 | 1.1 | 1.1 | 1.2 | 1.5 | 1.7 | 1.7 | 1.4 | 1.2 | 1.1 | .9 | .8 | .7 |
| 2.3 | 1.6 | 1.1 | 1.1 | .8 | .8 | .9 | .9 | 1.4 | 1.7 | 1.6 | 1.9 | 2.4 | 2.8 | 2.5 | 3.2 | 3.3 | 3.1 | 3.3 | 3.5 | 3.7 | 3.6 | 3.1 | 3.4 | 2.7 | 2.5 | 2.3 | 2.4 | 2.4 | 2.2 | 2.2 | 1.8 | 1.4 | 1.4 | 1.9 | 2.6 |
| 2.7 | 2.5 | 2.3 | 2.7 | 2.4 | 1.7 | 1.4 | 1.3 | 1.3 | 1.3 | 2.0 | 2.4 | 3.4 | 3.8 | 4.4 | 4.5 | 5.8 | 5.2 | 4.8 | 5.2 | 5.5 | 4.5 | 3.9 | 3.4 | 3.4 | 2.6 | 2.5 | 3.0 | 3.0 | 2.5 | 2.4 | 2.1 | 1.2 | 2.0 | 3.7 | 3.5 |
| 2.7 | 3.6 | 3.4 | 3.7 | 4.7 | 4.5 | 4.2 | 3.0 | 2.8 | 2.3 | 2.5 | 3.1 | 4.0 | 4.2 | 5.1 | 5.1 | 5.7 | 5.3 | 4.8 | 2.3 | 3.2 | 3.2 | 3.1 | 2.9 | 3.1 | 3.0 | 3.5 | 3.4 | 3.1 | 2.8 | 2.2 | 1.8 | 2.0 | 2.6 | 4.3 | 3.3 |
| 4.3 | 4.7 | 4.7 | 5.3 | 5.4 | 6.1 | 6.5 | 5.7 | 4.5 | 4.5 | 5.0 | 6.6 | 6.1 | 6.6 | 7.1 | 6.2 | 5.7 | 5.3 | 4.3 | 3.3 | 3.3 | 3.8 | 5.4 | 5.9 | 6.8 | 7.4 | 6.3 | 6.1 | 5.5 | 4.8 | 3.9 | 2.9 | 3.7 | 4.7 | 5.6 | 4.8 |
| 6.6 | 7.9 | 7.1 | 6.0 | 4.7 | 4.1 | 5.9 | 5.6 | 6.6 | 7.4 | 8.8 | 8.2 | 8.4 | 8.9 | 7.4 | 5.8 | 5.5 | 7.8 | 5.4 | 4.3 | 5.2 | 5.3 | 7.6 | 8.0 | 9.2 | 8.2 | 8.5 | 8.5 | 7.3 | 6.4 | 5.3 | 5.7 | 5.7 | 5.9 | 7.8 | 7.1 |
| 3.9 | 6.4 | 7.0 | 4.2 | 3.2 | 5.7 | 6.0 | 6.8 | 6.2 | 7.3 | 6.5 | 4.2 | 5.0 | 5.6 | 4.4 | 4.1 | 4.2 | 4.6 | 3.8 | 3.0 | 3.1 | 3.6 | 5.8 | 6.3 | 6.0 | 3.7 | 5.4 | 5.8 | 6.0 | 6.5 | 4.5 | 3.7 | 3.0 | 4.0 | 5.1 | 4.1 |
| 1.2 | 2.0 | 3.0 | 3.9 | 5.1 | 7.1 | 4.9 | 4.6 | 3.6 | 3.5 | 1.9 | 1.3 | 1.5 | 2.4 | 3.5 | 4.1 | 4.4 | 5.2 | 5.2 | 4.1 | 3.6 | 3.2 | 2.5 | 1.4 | .7 | 3.1 | 3.5 | 4.7 | 6.8 | 3.3 | 2.4 | 3.3 | 3.4 | 3.5 | 3.1 | 2.0 |
| 8.9 | 8.4 | 8.1 | 8.0 | 7.5 | 8.6 | 7.7 | 7.6 | 7.8 | 7.3 | 7.6 | 7.3 | 4.8 | 5.4 | 5.3 | 6.1 | 8.5 | 8.4 | 10.0 | 8.8 | 9.2 | 6.4 | 2.6 | 2.5 | 4.2 | 7.3 | 9.0 | 10.0 | 8.0 | 8.1 | 6.7 | 7.2 | 9.0 | 8.5 | 9.0 | 9.2 |
| 7.2 | 5.9 | 5.2 | 3.5 | 2.4 | 2.1 | 2.1 | 2.6 | 3.2 | 2.6 | 9.6 | 11.1 | 10.9 | 10.6 | 9.9 | 9.6 | 7.3 | 8.0 | 9.1 | 10.4 | 11.3 | 8.4 | 5.8 | 6.7 | 7.3 | 7.9 | 9.4 | 8.7 | 9.7 | 9.6 | 7.6 | 8.4 | 10.2 | 10.4 | 11.1 | 10.2 |
| 8.9 | 9.4 | 8.6 | 6.9 | 6.2 | 3.8 | 1.3 | 1.3 | .9 | 1.4 | 7.3 | 11.2 | 11.0 | 9.3 | 6.0 | 4.1 | 1.7 | 1.1 | 2.8 | 7.8 | 10.0 | 10.0 | 9.1 | 7.6 | 7.0 | 9.4 | 7.9 | 4.7 | 3.7 | 3.8 | 4.9 | 7.1 | 5.6 | 7.0 | 5.4 | 7.7 |
| 6.5 | 8.7 | 8.1 | 8.4 | 10.1 | 5.8 | 4.3 | 2.4 | 1.7 | 1.2 | 1.5 | 8.6 | 9.5 | 8.6 | 8.2 | 6.3 | 3.1 | 1.8 | 1.6 | 4.0 | 5.2 | 5.6 | 6.3 | 4.0 | 4.3 | 5.2 | 5.0 | 3.3 | 3.5 | 6.2 | 6.2 | 4.0 | 4.1 | 4.0 | 3.3 | 7.7 |
| 6.1 | 6.1 | 5.9 | 6.5 | 7.8 | 7.6 | 6.6 | 6.5 | 5.1 | 4.3 | 3.8 | 8.0 | 7.6 | 6.1 | 7.6 | 7.2 | 7.0 | 5.6 | 3.6 | 3.8 | 6.1 | 6.9 | 5.7 | 5.5 | 5.0 | 4.2 | 3.7 | 3.1 | 2.7 | 5.1 | 5.5 | 4.6 | 4.5 | 4.8 | 4.5 | 6.4 |
| 4.9 | 5.2 | 5.1 | 4.9 | 3.8 | 4.8 | 5.9 | 6.6 | 6.5 | 5.5 | 5.6 | 6.8 | 5.6 | 5.7 | 6.0 | 5.9 | 5.4 | 5.1 | 4.9 | 4.9 | 5.5 | 5.5 | 5.8 | 6.1 | 5.7 | 5.3 | 4.5 | 4.3 | 4.2 | 4.5 | 4.5 | 3.8 | 4.5 | 4.4 | 5.3 | 3.5 |
| 3.7 | 4.2 | 4.0 | 3.8 | 3.5 | 3.6 | 3.5 | 3.8 | 4.1 | 4.5 | 4.8 | 5.1 | 4.8 | 4.1 | 4.4 | 4.2 | 4.3 | 4.2 | 3.9 | 4.0 | 4.0 | 4.1 | 4.1 | 4.1 | 4.3 | 4.5 | 4.5 | 4.0 | 3.8 | 3.9 | 4.0 | 4.1 | 4.2 | 4.5 | 4.9 | 4.3 |
| 3.7 | 3.6 | 3.4 | 3.4 | 2.8 | 2.9 | 2.9 | 3.1 | 2.7 | 3.0 | 3.1 | 4.0 | 4.2 | 3.4 | 2.7 | 2.6 | 2.7 | 3.1 | 2.6 | 2.8 | 2.5 | 2.7 | 2.8 | 2.8 | 2.7 | 2.8 | 2.9 | 2.8 | 2.8 | 2.9 | 3.2 | 3.3 | 3.3 | 3.2 | 3.5 | 3.5 |
| 2.0 | 2.1 | 2.4 | 2.7 | 2.8 | 2.9 | 2.8 | 3.0 | 3.3 | 3.0 | 3.4 | 3.2 | 2.7 | 2.0 | 1.8 | 2.0 | 2.2 | 1.8 | 1.5 | 1.4 | 1.5 | 1.2 | .8 | .7 | 1.1 | 1.3 | .9 | .8 | .7 | .7 | .7 | .5 | .6 | 1.0 | 1.9 | 1.9 |
| 1.5 | 1.5 | 1.6 | 1.7 | 1.9 | 2.1 | 2.1 | 2.1 | 1.6 | .9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.5 | 1.3 | .9 | .9 | .8 | .7 | .6 | .6 | .6 | .7 | .7 | .7 | .6 | .6 | .6 | .5 | .4 | .7 | 1.2 | 1.5 | 1.6 |

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

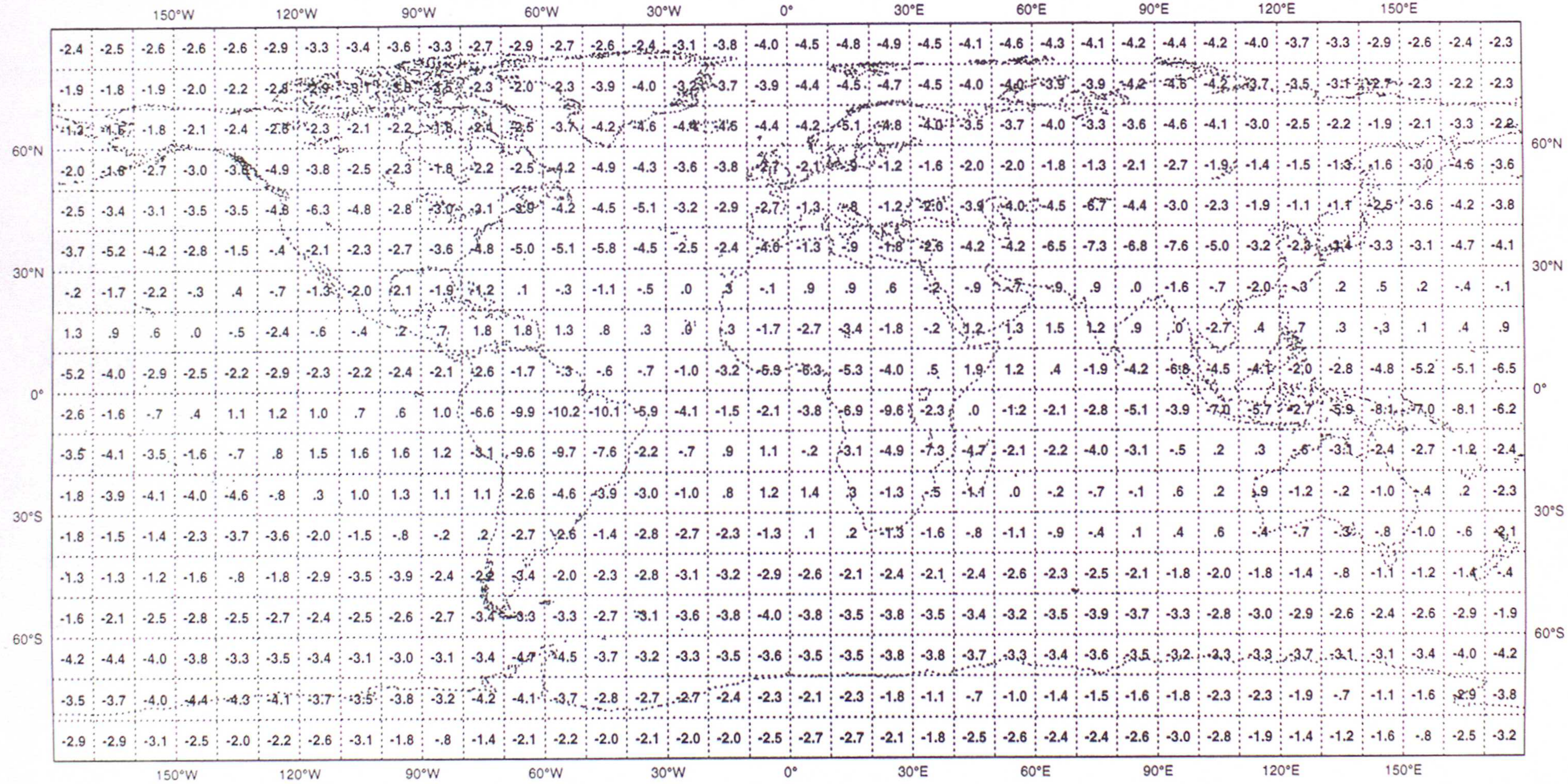
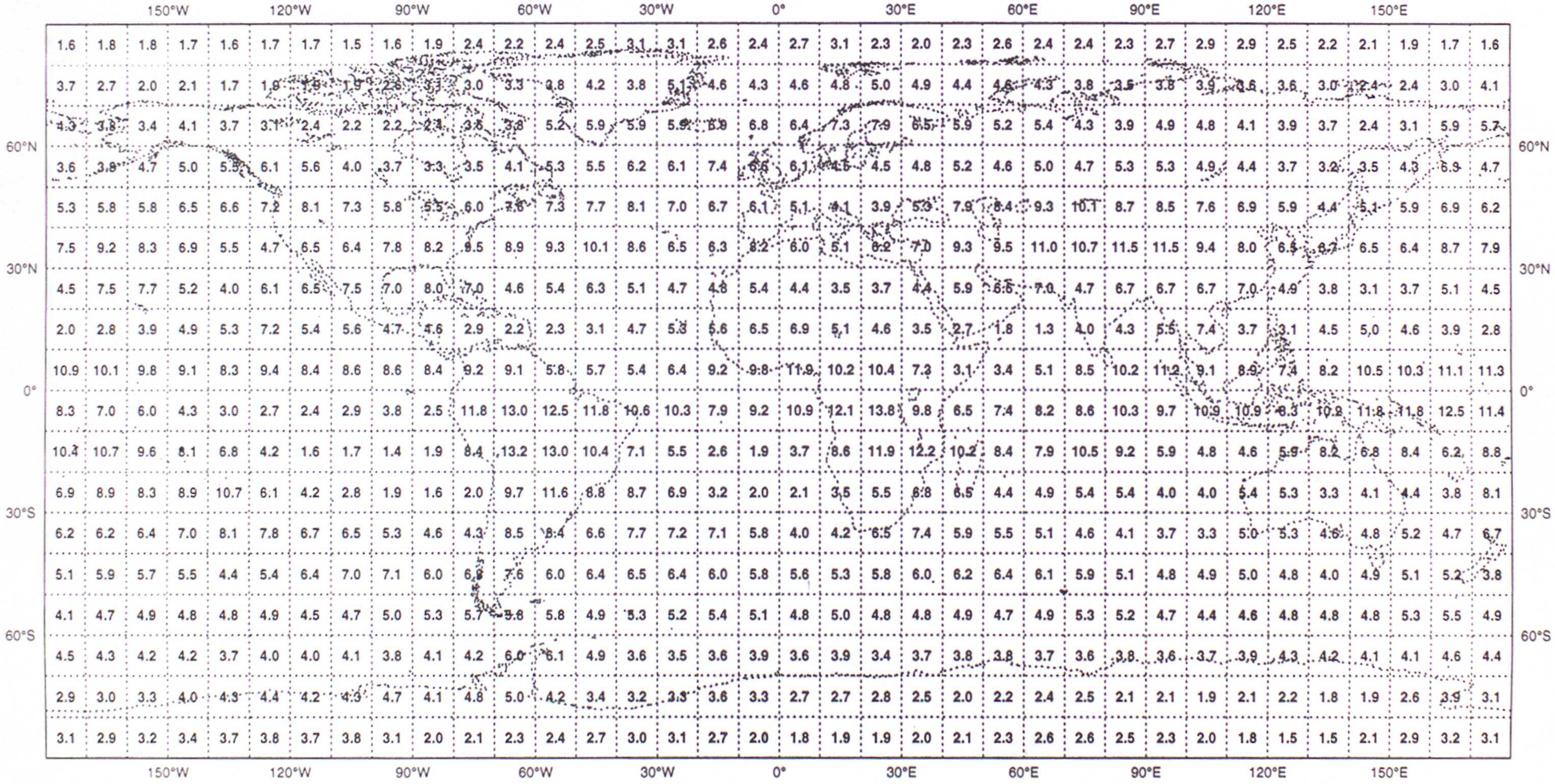
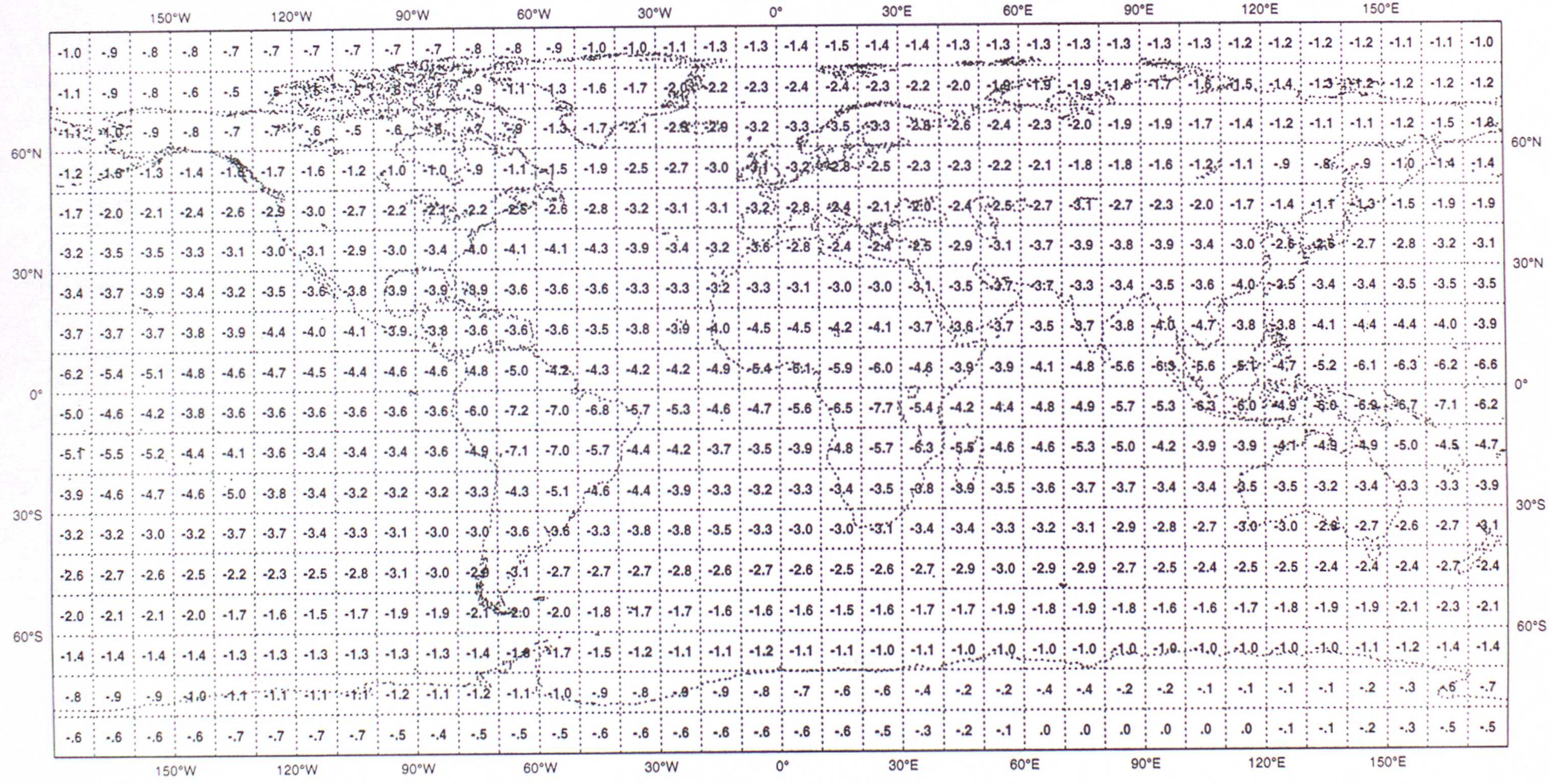

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-2.4 -2.5 -2.6 -2.6 -2.6 -2.9 -3.3 -3.4 -3.6 -3.3 -2.7 -2.9 -2.7 -2.6 -2.4 -3.1 -3.8 -4.0 -4.5 -4.8 -4.9 -4.5 -4.1 -4.6 -4.3 -4.1 -4.2 -4.4 -4.2 -4.0 -3.7 -3.3 -2.9 -2.6 -2.4 -2.3
-1.9 -1.8 -1.9 -2.0 -2.2 -2.8 -2.9 -3.1 -3.8 -3.5 -2.3 -2.0 -2.3 -3.9 -4.0 -3.2 -3.7 -3.9 -4.4 -4.5 -4.7 -4.5 -4.0 -4.0 -3.9 -3.9 -4.2 -4.6 -4.2 -3.7 -3.5 -3.1 -2.7 -2.3 -2.2 -2.3
-1.3 -1.5 -1.8 -2.1 -2.4 -2.8 -2.3 -2.1 -2.2 -1.8 -2.4 -2.5 -3.7 -4.2 -4.6 -4.4 -4.6 -4.4 -4.2 -5.1 -4.8 -4.0 -3.5 -3.7 -4.0 -3.3 -3.6 -4.6 -4.1 -3.0 -2.5 -2.2 -1.9 -2.1 -3.3 -2.2
-2.0 -1.6 -2.7 -3.0 -3.8 -4.9 -3.8 -2.5 -2.3 -1.8 -2.2 -2.5 -4.2 -4.9 -4.3 -3.6 -3.8 -2.7 -2.1 -.9 -1.2 -1.6 -2.0 -2.0 -1.8 -1.3 -2.1 -2.7 -1.9 -1.4 -1.5 -1.3 -1.6 -3.0 -4.6 -3.6
-2.5 -3.4 -3.1 -3.5 -3.5 -4.8 -6.3 -4.8 -2.8 -3.0 -3.1 -3.9 -4.2 -4.5 -5.1 -3.2 -2.9 -2.7 -1.3 -.8 -1.2 -2.0 -3.9 -4.0 -4.5 -6.7 -4.4 -3.0 -2.3 -1.9 -1.1 -1.1 -2.5 -3.6 -4.2 -3.8
-3.7 -5.2 -4.2 -2.8 -1.5 -.4 -2.1 -2.3 -2.7 -3.6 -4.8 -5.0 -5.1 -5.8 -4.5 -2.5 -2.4 -4.6 -1.3 -.9 -1.8 -2.6 -4.2 -4.2 -6.5 -7.3 -6.8 -7.6 -5.0 -3.2 -2.3 -3.4 -3.3 -3.1 -4.7 -4.1
-.2 -1.7 -2.2 -.3 .4 -.7 -1.3 -2.0 2.1 -1.9 1.2 .1 -.3 -1.1 -.5 .0 .3 -.1 .9 .9 .6 -.2 -.9 -.7 -.9 .9 .0 -1.6 -.7 -2.0 -.3 .2 .5 .2 -.4 -.1
1.3 .9 .6 .0 -.5 -2.4 -.6 -.4 .2 .7 1.8 1.8 1.3 .8 .3 .0 .3 -1.7 -2.7 -3.4 -1.8 -.2 1.2 1.3 1.5 1.2 .9 .0 -2.7 .4 .7 .3 -.3 .1 .4 .9
-5.2 -4.0 -2.9 -2.5 -2.2 -2.9 -2.3 -2.2 -2.4 -2.1 -2.6 -1.7 -.3 -.6 -.7 -1.0 -3.2 -5.9 -6.3 -5.3 -4.0 .5 1.9 1.2 .4 -1.9 -4.2 -6.8 -4.5 -4.1 -2.0 -2.8 -4.8 -5.2 -5.1 -6.5
-2.6 -1.6 -.7 .4 1.1 1.2 1.0 .7 .6 1.0 -6.6 -9.9 -10.2 -10.1 -5.9 -4.1 -1.5 -2.1 -3.8 -6.9 -9.6 -2.3 .0 -1.2 -2.1 -2.8 -5.1 -3.9 -7.0 -5.7 -2.7 -5.9 -8.1 -7.0 -8.1 -6.2
-3.5 -4.1 -3.5 -1.6 -.7 .8 1.5 1.6 1.6 1.2 -3.1 -9.6 -9.7 -7.6 -2.2 -.7 .9 1.1 -.2 -3.1 -4.9 -7.3 -4.7 -2.1 -2.2 -4.0 -3.1 -.5 .2 .3 -.6 -3.1 -2.4 -2.7 -1.2 -2.4
-1.8 -3.9 -4.1 -4.0 -4.6 -.8 .3 1.0 1.3 1.1 1.1 -2.6 -4.6 -3.9 -3.0 -1.0 .8 1.2 1.4 .3 -1.3 -.5 -1.1 .0 -.2 -.7 -.1 .6 .2 .9 -1.2 -.2 -1.0 -.4 .2 -2.3
-1.8 -1.5 -1.4 -2.3 -3.7 -3.6 -2.0 -1.5 -.8 -.2 .2 -2.7 -2.6 -1.4 -2.8 -2.7 -2.3 -1.3 .1 .2 -1.3 -1.6 -.8 -1.1 -.9 -.4 .1 .4 .6 -.4 -.7 -.3 -.8 -1.0 -.6 -2.1
-1.3 -1.3 -1.2 -1.6 -.8 -1.8 -2.9 -3.5 -3.9 -2.4 -2.2 -3.4 -2.0 -2.3 -2.8 -3.1 -3.2 -2.9 -2.6 -2.1 -2.4 -2.1 -2.4 -2.6 -2.3 -2.5 -2.1 -1.8 -2.0 -1.8 -1.4 -.8 -1.1 -1.2 -1.4 -.4
-1.6 -2.1 -2.5 -2.8 -2.5 -2.7 -2.4 -2.5 -2.6 -2.7 -3.4 -3.3 -3.3 -2.7 -3.1 -3.6 -3.8 -4.0 -3.8 -3.5 -3.8 -3.5 -3.4 -3.2 -3.5 -3.9 -3.7 -3.3 -2.8 -3.0 -2.9 -2.6 -2.4 -2.6 -2.9 -1.9
-4.2 -4.4 -4.0 -3.8 -3.3 -3.5 -3.4 -3.1 -3.0 -3.1 -3.4 -4.7 -4.5 -3.7 -3.2 -3.3 -3.5 -3.6 -3.5 -3.5 -3.8 -3.8 -3.7 -3.3 -3.4 -3.6 -3.5 -3.2 -3.3 -3.3 -3.7 -3.1 -3.1 -3.4 -4.0 -4.2
-3.5 -3.7 -4.0 -4.4 -4.3 -4.1 -3.7 -3.5 -3.8 -3.2 -4.2 -4.1 -3.7 -2.8 -2.7 -2.7 -2.4 -2.3 -2.1 -2.3 -1.8 -1.1 -.7 -1.0 -1.4 -1.5 -1.6 -1.8 -2.3 -2.3 -1.9 -.7 -1.1 -1.6 -2.9 -3.8
-2.9 -2.9 -3.1 -2.5 -2.0 -2.2 -2.6 -3.1 -1.8 -.8 -1.4 -2.1 -2.2 -2.0 -2.1 -2.0 -2.0 -2.5 -2.7 -2.7 -2.1 -1.8 -2.5 -2.6 -2.4 -2.4 -2.6 -3.0 -2.8 -1.9 -1.4 -1.2 -1.6 -.8 -2.5 -3.2

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



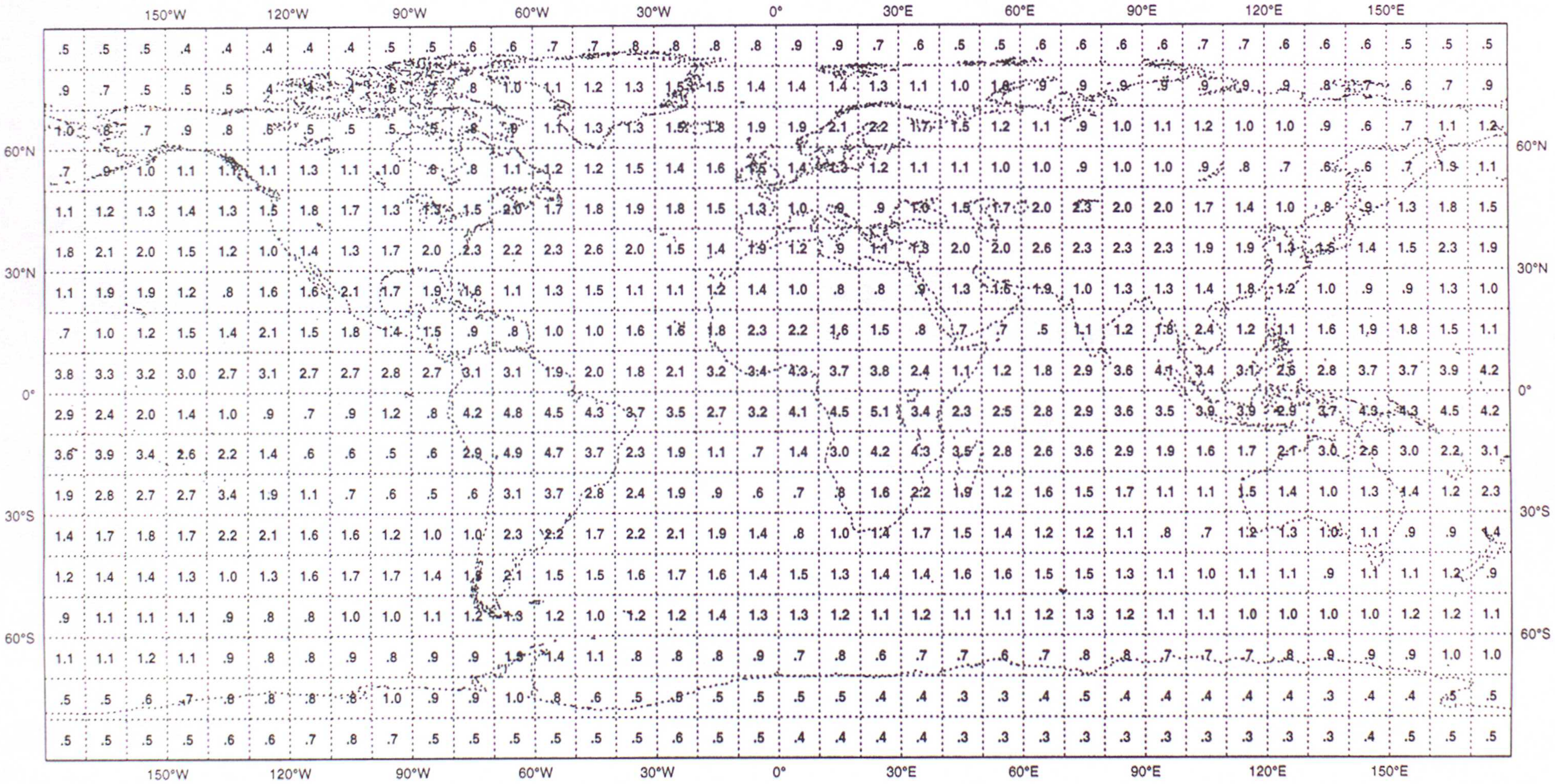
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.6 | 1.8 | 1.8 | 1.7 | 1.6 | 1.7 | 1.7 | 1.5 | 1.6 | 1.9 | 2.4 | 2.2 | 2.4 | 2.5 | 3.1 | 3.1 | 2.6 | 2.4 | 2.7 | 3.1 | 2.3 | 2.0 | 2.3 | 2.6 | 2.4 | 2.4 | 2.3 | 2.7 | 2.9 | 2.9 | 2.5 | 2.2 | 2.1 | 1.9 | 1.7 | 1.6 |
| 3.7 | 2.7 | 2.0 | 2.1 | 1.7 | 1.8 | 1.9 | 1.9 | 2.6 | 3.1 | 3.0 | 3.3 | 3.8 | 4.2 | 3.8 | 5.1 | 4.6 | 4.3 | 4.6 | 4.8 | 5.0 | 4.9 | 4.4 | 4.6 | 4.3 | 3.8 | 3.5 | 3.8 | 3.9 | 3.6 | 3.6 | 3.0 | 2.4 | 2.4 | 3.0 | 4.1 |
| 4.3 | 3.8 | 3.4 | 4.1 | 3.7 | 3.1 | 2.4 | 2.2 | 2.2 | 2.4 | 3.6 | 3.8 | 5.2 | 5.9 | 5.9 | 5.9 | 5.9 | 6.8 | 6.4 | 7.3 | 7.9 | 6.5 | 5.9 | 5.2 | 5.4 | 4.3 | 3.9 | 4.9 | 4.8 | 4.1 | 3.9 | 3.7 | 2.4 | 3.1 | 5.9 | 5.7 |
| 3.6 | 3.8 | 4.7 | 5.0 | 5.5 | 6.1 | 5.6 | 4.0 | 3.7 | 3.3 | 3.5 | 4.1 | 5.3 | 5.5 | 6.2 | 6.1 | 7.4 | 6.6 | 6.1 | 4.5 | 4.5 | 4.8 | 5.2 | 4.6 | 5.0 | 4.7 | 5.3 | 5.3 | 4.9 | 4.4 | 3.7 | 3.2 | 3.5 | 4.3 | 6.9 | 4.7 |
| 5.3 | 5.8 | 5.8 | 6.5 | 6.6 | 7.2 | 8.1 | 7.3 | 5.8 | 5.5 | 6.0 | 7.6 | 7.3 | 7.7 | 8.1 | 7.0 | 6.7 | 6.1 | 5.1 | 4.1 | 3.9 | 5.3 | 7.9 | 8.4 | 9.3 | 10.1 | 8.7 | 8.5 | 7.6 | 6.9 | 5.9 | 4.4 | 5.1 | 5.9 | 6.9 | 6.2 |
| 7.5 | 9.2 | 8.3 | 6.9 | 5.5 | 4.7 | 6.5 | 6.4 | 7.8 | 8.2 | 8.5 | 8.9 | 9.3 | 10.1 | 8.6 | 6.5 | 6.3 | 8.2 | 6.0 | 5.1 | 6.2 | 7.0 | 9.3 | 9.5 | 11.0 | 10.7 | 11.5 | 11.5 | 9.4 | 8.0 | 6.5 | 6.7 | 6.5 | 6.4 | 8.7 | 7.9 |
| 4.5 | 7.5 | 7.7 | 5.2 | 4.0 | 6.1 | 6.5 | 7.5 | 7.0 | 8.0 | 7.0 | 4.6 | 5.4 | 6.3 | 5.1 | 4.7 | 4.8 | 5.4 | 4.4 | 3.5 | 3.7 | 4.4 | 5.9 | 6.6 | 7.0 | 4.7 | 6.7 | 6.7 | 6.7 | 7.0 | 4.9 | 3.8 | 3.1 | 3.7 | 5.1 | 4.5 |
| 2.0 | 2.8 | 3.9 | 4.9 | 5.3 | 7.2 | 5.4 | 5.6 | 4.7 | 4.6 | 2.9 | 2.2 | 2.3 | 3.1 | 4.7 | 5.3 | 5.6 | 6.5 | 6.9 | 5.1 | 4.6 | 3.5 | 2.7 | 1.8 | 1.3 | 4.0 | 4.3 | 5.5 | 7.4 | 3.7 | 3.1 | 4.5 | 5.0 | 4.6 | 3.9 | 2.8 |
| 10.9 | 10.1 | 9.8 | 9.1 | 8.3 | 9.4 | 8.4 | 8.6 | 8.6 | 8.4 | 9.2 | 9.1 | 5.8 | 5.7 | 5.4 | 6.4 | 9.2 | 9.8 | 11.9 | 10.2 | 10.4 | 7.3 | 3.1 | 3.4 | 5.1 | 8.5 | 10.2 | 11.2 | 9.1 | 8.9 | 7.4 | 8.2 | 10.5 | 10.3 | 11.1 | 11.3 |
| 8.3 | 7.0 | 6.0 | 4.3 | 3.0 | 2.7 | 2.4 | 2.9 | 3.8 | 2.5 | 11.8 | 13.0 | 12.5 | 11.8 | 10.6 | 10.3 | 7.9 | 9.2 | 10.9 | 12.1 | 13.8 | 9.8 | 6.5 | 7.4 | 8.2 | 8.6 | 10.3 | 9.7 | 10.9 | 10.9 | 8.3 | 10.2 | 11.8 | 11.8 | 12.5 | 11.4 |
| 10.4 | 10.7 | 9.6 | 8.1 | 6.8 | 4.2 | 1.6 | 1.7 | 1.4 | 1.9 | 8.4 | 13.2 | 13.0 | 10.4 | 7.1 | 5.5 | 2.6 | 1.9 | 3.7 | 8.6 | 11.9 | 12.2 | 10.2 | 8.4 | 7.9 | 10.5 | 9.2 | 5.9 | 4.8 | 4.6 | 5.9 | 8.2 | 6.8 | 8.4 | 6.2 | 8.8 |
| 6.9 | 8.9 | 8.3 | 8.9 | 10.7 | 6.1 | 4.2 | 2.8 | 1.9 | 1.6 | 2.0 | 9.7 | 11.6 | 8.8 | 8.7 | 6.9 | 3.2 | 2.0 | 2.1 | 3.5 | 5.5 | 6.8 | 6.5 | 4.4 | 4.9 | 5.4 | 5.4 | 4.0 | 4.0 | 5.4 | 5.3 | 3.3 | 4.1 | 4.4 | 3.8 | 8.1 |
| 6.2 | 6.2 | 6.4 | 7.0 | 8.1 | 7.8 | 6.7 | 6.5 | 5.3 | 4.6 | 4.3 | 8.5 | 8.4 | 6.6 | 7.7 | 7.2 | 7.1 | 5.8 | 4.0 | 4.2 | 6.5 | 7.4 | 5.9 | 5.5 | 5.1 | 4.6 | 4.1 | 3.7 | 3.3 | 5.0 | 5.3 | 4.6 | 4.8 | 5.2 | 4.7 | 6.7 |
| 5.1 | 5.9 | 5.7 | 5.5 | 4.4 | 5.4 | 6.4 | 7.0 | 7.1 | 6.0 | 6.8 | 7.6 | 6.0 | 6.4 | 6.5 | 6.4 | 6.0 | 5.8 | 5.6 | 5.3 | 5.8 | 6.0 | 6.2 | 6.4 | 6.1 | 5.9 | 5.1 | 4.8 | 4.9 | 5.0 | 4.8 | 4.0 | 4.9 | 5.1 | 5.2 | 3.8 |
| 4.1 | 4.7 | 4.9 | 4.8 | 4.8 | 4.9 | 4.5 | 4.7 | 5.0 | 5.3 | 5.7 | 5.8 | 5.8 | 4.9 | 5.3 | 5.2 | 5.4 | 5.1 | 4.8 | 5.0 | 4.8 | 4.8 | 4.9 | 4.7 | 4.9 | 5.3 | 5.2 | 4.7 | 4.4 | 4.6 | 4.8 | 4.8 | 4.8 | 5.3 | 5.5 | 4.9 |
| 4.5 | 4.3 | 4.2 | 4.2 | 3.7 | 4.0 | 4.0 | 4.1 | 3.8 | 4.1 | 4.2 | 6.0 | 6.1 | 4.9 | 3.6 | 3.5 | 3.6 | 3.9 | 3.6 | 3.9 | 3.4 | 3.7 | 3.8 | 3.8 | 3.7 | 3.6 | 3.8 | 3.6 | 3.7 | 3.9 | 4.3 | 4.2 | 4.1 | 4.1 | 4.6 | 4.4 |
| 2.9 | 3.0 | 3.3 | 4.0 | 4.3 | 4.4 | 4.2 | 4.3 | 4.7 | 4.1 | 4.8 | 5.0 | 4.2 | 3.4 | 3.2 | 3.3 | 3.6 | 3.3 | 2.7 | 2.7 | 2.8 | 2.5 | 2.0 | 2.2 | 2.4 | 2.5 | 2.1 | 2.1 | 1.9 | 2.1 | 2.2 | 1.8 | 1.9 | 2.6 | 3.9 | 3.1 |
| 3.1 | 2.9 | 3.2 | 3.4 | 3.7 | 3.8 | 3.7 | 3.8 | 3.1 | 2.0 | 2.1 | 2.3 | 2.4 | 2.7 | 3.0 | 3.1 | 2.7 | 2.0 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.6 | 2.6 | 2.5 | 2.3 | 2.0 | 1.8 | 1.5 | 1.5 | 2.1 | 2.9 | 3.2 | 3.1 |

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -1.0 | -.9 | -.8 | -.8 | -.7 | -.7 | -.7 | -.7 | -.7 | -.7 | -.8 | -.8 | -.9 | -1.0 | -1.0 | -1.1 | -1.3 | -1.3 | -1.4 | -1.5 | -1.4 | -1.4 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.2 | -1.2 | -1.2 | -1.2 | -1.1 | -1.1 | -1.0 |
| -1.1 | -.9 | -.8 | -.6 | -.5 | -.5 | -.5 | -.5 | -.8 | -.7 | -.9 | -1.1 | -1.3 | -1.6 | -1.7 | -2.0 | -2.2 | -2.3 | -2.4 | -2.4 | -2.3 | -2.2 | -2.0 | -1.9 | -1.9 | -1.9 | -1.8 | -1.7 | -1.6 | -1.5 | -1.4 | -1.3 | -1.2 | -1.2 | -1.2 | -1.2 |
| -1.1 | -1.0 | -.9 | -.8 | -.7 | -.7 | -.6 | -.5 | -.6 | -.6 | -.7 | -.9 | -1.3 | -1.7 | -2.1 | -2.8 | -2.9 | -3.2 | -3.3 | -3.5 | -3.3 | -2.8 | -2.6 | -2.4 | -2.3 | -2.0 | -1.9 | -1.9 | -1.7 | -1.4 | -1.2 | -1.1 | -1.1 | -1.2 | -1.5 | -1.8 |
| -1.2 | -1.6 | -1.3 | -1.4 | -1.8 | -1.7 | -1.6 | -1.2 | -1.0 | -1.0 | -.9 | -1.1 | -1.5 | -1.9 | -2.5 | -2.7 | -3.0 | -3.1 | -3.2 | -2.8 | -2.5 | -2.3 | -2.3 | -2.2 | -2.1 | -1.8 | -1.8 | -1.6 | -1.2 | -1.1 | -.9 | -.8 | -.9 | -1.0 | -1.4 | -1.4 |
| -1.7 | -2.0 | -2.1 | -2.4 | -2.6 | -2.9 | -3.0 | -2.7 | -2.2 | -2.1 | -2.2 | -2.5 | -2.6 | -2.8 | -3.2 | -3.1 | -3.1 | -3.2 | -2.8 | -2.4 | -2.1 | -2.0 | -2.4 | -2.5 | -2.7 | -3.1 | -2.7 | -2.3 | -2.0 | -1.7 | -1.4 | -1.1 | -1.3 | -1.5 | -1.9 | -1.9 |
| -3.2 | -3.5 | -3.5 | -3.3 | -3.1 | -3.0 | -3.1 | -2.9 | -3.0 | -3.4 | -4.0 | -4.1 | -4.1 | -4.3 | -3.9 | -3.4 | -3.2 | -3.6 | -2.8 | -2.4 | -2.4 | -2.5 | -2.9 | -3.1 | -3.7 | -3.9 | -3.8 | -3.9 | -3.4 | -3.0 | -2.6 | -2.6 | -2.7 | -2.8 | -3.2 | -3.1 |
| -3.4 | -3.7 | -3.9 | -3.4 | -3.2 | -3.5 | -3.6 | -3.8 | -3.9 | -3.9 | -3.9 | -3.6 | -3.6 | -3.6 | -3.3 | -3.3 | -3.2 | -3.3 | -3.1 | -3.0 | -3.0 | -3.1 | -3.5 | -3.7 | -3.7 | -3.3 | -3.4 | -3.5 | -3.6 | -4.0 | -3.5 | -3.4 | -3.4 | -3.5 | -3.5 | -3.5 |
| -3.7 | -3.7 | -3.7 | -3.8 | -3.9 | -4.4 | -4.0 | -4.1 | -3.9 | -3.8 | -3.6 | -3.6 | -3.6 | -3.5 | -3.8 | -3.9 | -4.0 | -4.5 | -4.5 | -4.2 | -4.1 | -3.7 | -3.6 | -3.7 | -3.5 | -3.7 | -3.8 | -4.0 | -4.7 | -3.8 | -3.8 | -4.1 | -4.4 | -4.4 | -4.0 | -3.9 |
| -6.2 | -5.4 | -5.1 | -4.8 | -4.6 | -4.7 | -4.5 | -4.4 | -4.6 | -4.6 | -4.8 | -5.0 | -4.2 | -4.3 | -4.2 | -4.2 | -4.9 | -5.4 | -6.1 | -5.9 | -6.0 | -4.6 | -3.9 | -3.9 | -4.1 | -4.8 | -5.6 | -6.3 | -5.6 | -5.1 | -4.7 | -5.2 | -6.1 | -6.3 | -6.2 | -6.6 |
| -5.0 | -4.6 | -4.2 | -3.8 | -3.6 | -3.6 | -3.6 | -3.6 | -3.6 | -3.6 | -6.0 | -7.2 | -7.0 | -6.8 | -5.7 | -5.3 | -4.6 | -4.7 | -5.6 | -6.5 | -7.7 | -5.4 | -4.2 | -4.4 | -4.8 | -4.9 | -5.7 | -5.3 | -6.3 | -6.0 | -4.9 | -6.0 | -6.9 | -6.7 | -7.1 | -6.2 |
| -5.1 | -5.5 | -5.2 | -4.4 | -4.1 | -3.6 | -3.4 | -3.4 | -3.4 | -3.6 | -4.9 | -7.1 | -7.0 | -5.7 | -4.4 | -4.2 | -3.7 | -3.5 | -3.9 | -4.8 | -5.7 | -6.3 | -5.5 | -4.6 | -4.6 | -5.3 | -5.0 | -4.2 | -3.9 | -3.9 | -4.1 | -4.9 | -4.9 | -5.0 | -4.5 | -4.7 |
| -3.9 | -4.6 | -4.7 | -4.6 | -5.0 | -3.8 | -3.4 | -3.2 | -3.2 | -3.2 | -3.3 | -4.3 | -5.1 | -4.6 | -4.4 | -3.9 | -3.3 | -3.2 | -3.3 | -3.4 | -3.5 | -3.8 | -3.9 | -3.5 | -3.6 | -3.7 | -3.7 | -3.4 | -3.4 | -3.5 | -3.5 | -3.2 | -3.4 | -3.3 | -3.3 | -3.9 |
| -3.2 | -3.2 | -3.0 | -3.2 | -3.7 | -3.7 | -3.4 | -3.3 | -3.1 | -3.0 | -3.0 | -3.6 | -3.6 | -3.3 | -3.8 | -3.8 | -3.5 | -3.3 | -3.0 | -3.0 | -3.1 | -3.4 | -3.4 | -3.3 | -3.2 | -3.1 | -2.9 | -2.8 | -2.7 | -3.0 | -3.0 | -2.8 | -2.7 | -2.6 | -2.7 | -3.1 |
| -2.6 | -2.7 | -2.6 | -2.5 | -2.2 | -2.3 | -2.5 | -2.8 | -3.1 | -3.0 | -2.9 | -3.1 | -2.7 | -2.7 | -2.7 | -2.8 | -2.6 | -2.7 | -2.6 | -2.5 | -2.6 | -2.7 | -2.9 | -3.0 | -2.9 | -2.9 | -2.7 | -2.5 | -2.4 | -2.5 | -2.5 | -2.4 | -2.4 | -2.4 | -2.7 | -2.4 |
| -2.0 | -2.1 | -2.1 | -2.0 | -1.7 | -1.6 | -1.5 | -1.7 | -1.9 | -1.9 | -2.1 | -2.0 | -2.0 | -1.8 | -1.7 | -1.7 | -1.6 | -1.6 | -1.6 | -1.5 | -1.6 | -1.7 | -1.7 | -1.9 | -1.8 | -1.9 | -1.8 | -1.6 | -1.6 | -1.7 | -1.8 | -1.9 | -1.9 | -2.1 | -2.3 | -2.1 |
| -1.4 | -1.4 | -1.4 | -1.4 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.4 | -1.8 | -1.7 | -1.5 | -1.2 | -1.1 | -1.1 | -1.2 | -1.1 | -1.1 | -1.0 | -1.1 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.1 | -1.2 | -1.4 | -1.4 |
| -.8 | -.9 | -.9 | -1.0 | -1.1 | -1.1 | -1.1 | -1.1 | -1.2 | -1.1 | -1.2 | -1.1 | -1.0 | -.9 | -.8 | -.9 | -.9 | -.8 | -.7 | -.6 | -.6 | -.4 | -.2 | -.2 | -.4 | -.4 | -.2 | -.2 | -.1 | -.1 | -.1 | -.1 | -.2 | -.3 | -.6 | -.7 |
| -.6 | -.6 | -.6 | -.6 | -.7 | -.7 | -.7 | -.7 | -.5 | -.4 | -.5 | -.5 | -.5 | -.6 | -.6 | -.6 | -.6 | -.6 | -.6 | -.6 | -.5 | -.3 | -.2 | -.1 | .0 | .0 | .0 | .0 | .0 | .0 | -.1 | -.1 | -.2 | -.3 | -.5 | -.5 |

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



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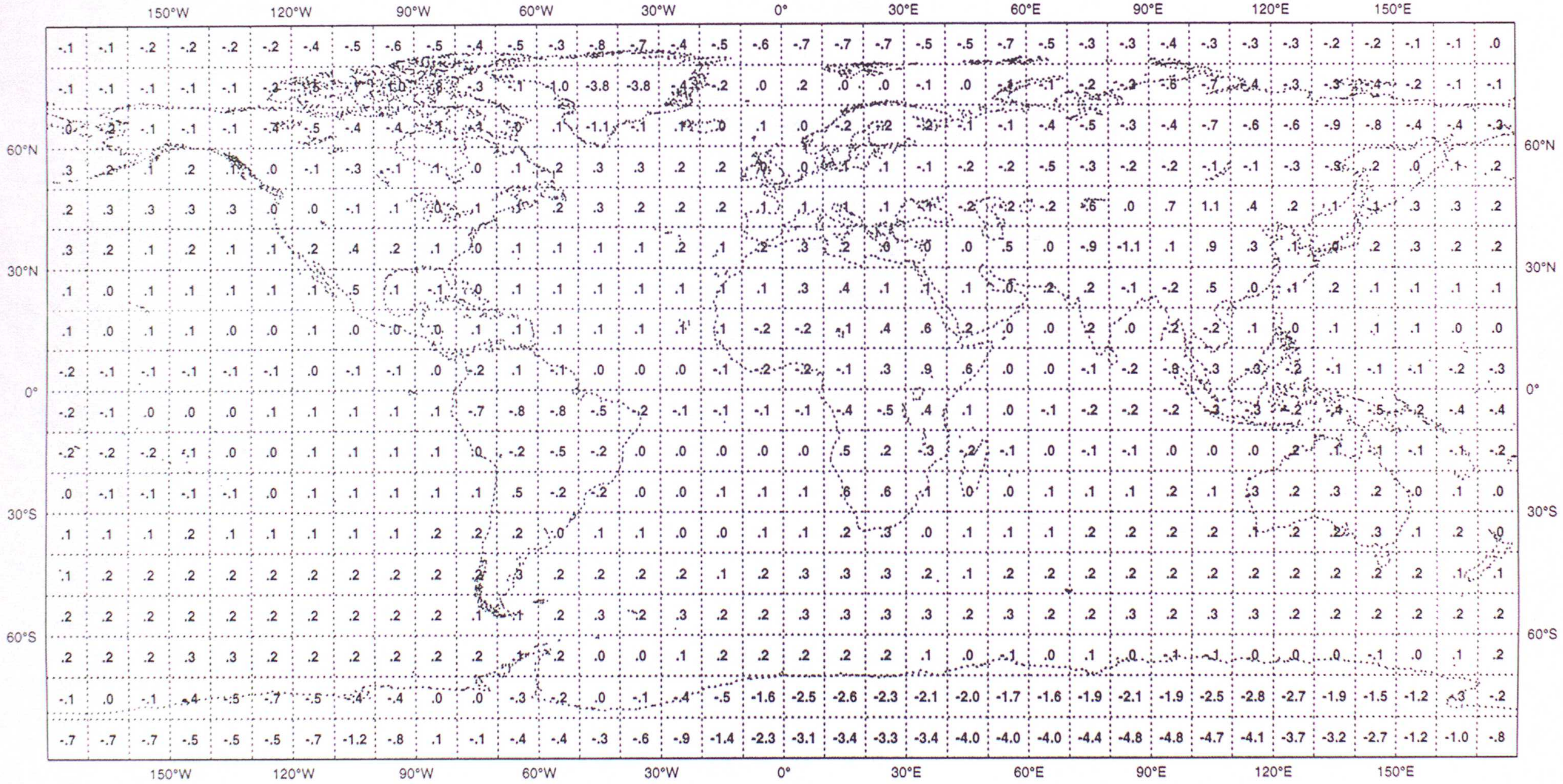
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .5 | .5 | .5 | .4 | .4 | .4 | .4 | .4 | .5 | .5 | .6 | .6 | .7 | .7 | .8 | .8 | .8 | .8 | .9 | .9 | .7 | .6 | .5 | .5 | .6 | .6 | .6 | .6 | .7 | .7 | .6 | .6 | .6 | .5 | .5 | .5 |
| .9 | .7 | .5 | .5 | .5 | .4 | .4 | .4 | .6 | .7 | .8 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.1 | 1.0 | 1.8 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .8 | .7 | .6 | .7 | .9 |
| 1.0 | .8 | .7 | .9 | .8 | .6 | .5 | .5 | .5 | .5 | .8 | .9 | 1.1 | 1.3 | 1.3 | 1.5 | 1.8 | 1.9 | 1.9 | 2.1 | 2.2 | 1.7 | 1.5 | 1.2 | 1.1 | .9 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | .9 | .6 | .7 | 1.1 | 1.2 |
| .7 | .9 | 1.0 | 1.1 | 1.1 | 1.1 | 1.3 | 1.1 | 1.0 | .8 | .8 | 1.1 | 1.2 | 1.2 | 1.5 | 1.4 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | .9 | 1.0 | 1.0 | .9 | .8 | .7 | .6 | .6 | .7 | 1.9 | 1.1 |
| 1.1 | 1.2 | 1.3 | 1.4 | 1.3 | 1.5 | 1.8 | 1.7 | 1.3 | 1.3 | 1.5 | 2.0 | 1.7 | 1.8 | 1.9 | 1.8 | 1.5 | 1.3 | 1.0 | .9 | .9 | 1.0 | 1.5 | 1.7 | 2.0 | 2.3 | 2.0 | 2.0 | 1.7 | 1.4 | 1.0 | .8 | .9 | 1.3 | 1.8 | 1.5 |
| 1.8 | 2.1 | 2.0 | 1.5 | 1.2 | 1.0 | 1.4 | 1.3 | 1.7 | 2.0 | 2.3 | 2.2 | 2.3 | 2.6 | 2.0 | 1.5 | 1.4 | 1.9 | 1.2 | .9 | 1.1 | 1.3 | 2.0 | 2.0 | 2.6 | 2.3 | 2.3 | 2.3 | 1.9 | 1.9 | 1.3 | 1.5 | 1.4 | 1.5 | 2.3 | 1.9 |
| 1.1 | 1.9 | 1.9 | 1.2 | .8 | 1.6 | 1.6 | 2.1 | 1.7 | 1.9 | 1.6 | 1.1 | 1.3 | 1.5 | 1.1 | 1.1 | 1.2 | 1.4 | 1.0 | .8 | .8 | .9 | 1.3 | 1.6 | 1.9 | 1.0 | 1.3 | 1.3 | 1.4 | 1.8 | 1.2 | 1.0 | .9 | .9 | 1.3 | 1.0 |
| .7 | 1.0 | 1.2 | 1.5 | 1.4 | 2.1 | 1.5 | 1.8 | 1.4 | 1.5 | .9 | .8 | 1.0 | 1.0 | 1.6 | 1.6 | 1.8 | 2.3 | 2.2 | 1.6 | 1.5 | .8 | .7 | .7 | .5 | 1.1 | 1.2 | 1.8 | 2.4 | 1.2 | 1.1 | 1.6 | 1.9 | 1.8 | 1.5 | 1.1 |
| 3.8 | 3.3 | 3.2 | 3.0 | 2.7 | 3.1 | 2.7 | 2.7 | 2.8 | 2.7 | 3.1 | 3.1 | 1.9 | 2.0 | 1.8 | 2.1 | 3.2 | 3.4 | 4.3 | 3.7 | 3.8 | 2.4 | 1.1 | 1.2 | 1.8 | 2.9 | 3.6 | 4.1 | 3.4 | 3.1 | 2.6 | 2.8 | 3.7 | 3.7 | 3.9 | 4.2 |
| 2.9 | 2.4 | 2.0 | 1.4 | 1.0 | .9 | .7 | .9 | 1.2 | .8 | 4.2 | 4.8 | 4.5 | 4.3 | 3.7 | 3.5 | 2.7 | 3.2 | 4.1 | 4.5 | 5.1 | 3.4 | 2.3 | 2.5 | 2.8 | 2.9 | 3.6 | 3.5 | 3.9 | 3.9 | 2.9 | 3.7 | 4.3 | 4.3 | 4.5 | 4.2 |
| 3.6 | 3.9 | 3.4 | 2.6 | 2.2 | 1.4 | .6 | .6 | .5 | .6 | 2.9 | 4.9 | 4.7 | 3.7 | 2.3 | 1.9 | 1.1 | .7 | 1.4 | 3.0 | 4.2 | 4.3 | 3.5 | 2.8 | 2.6 | 3.6 | 2.9 | 1.9 | 1.6 | 1.7 | 2.1 | 3.0 | 2.6 | 3.0 | 2.2 | 3.1 |
| 1.9 | 2.8 | 2.7 | 2.7 | 3.4 | 1.9 | 1.1 | .7 | .6 | .5 | .6 | 3.1 | 3.7 | 2.8 | 2.4 | 1.9 | .9 | .6 | .7 | .8 | 1.6 | 2.2 | 1.9 | 1.2 | 1.6 | 1.5 | 1.7 | 1.1 | 1.1 | 1.5 | 1.4 | 1.0 | 1.3 | 1.4 | 1.2 | 2.3 |
| 1.4 | 1.7 | 1.8 | 1.7 | 2.2 | 2.1 | 1.6 | 1.6 | 1.2 | 1.0 | 1.0 | 2.3 | 2.2 | 1.7 | 2.2 | 2.1 | 1.9 | 1.4 | .8 | 1.0 | 1.4 | 1.7 | 1.5 | 1.4 | 1.2 | 1.2 | 1.1 | .8 | .7 | 1.2 | 1.3 | 1.0 | 1.1 | .9 | .9 | 1.4 |
| 1.2 | 1.4 | 1.4 | 1.3 | 1.0 | 1.3 | 1.6 | 1.7 | 1.7 | 1.4 | 1.8 | 2.1 | 1.5 | 1.5 | 1.6 | 1.7 | 1.6 | 1.4 | 1.5 | 1.3 | 1.4 | 1.4 | 1.6 | 1.6 | 1.5 | 1.5 | 1.3 | 1.1 | 1.0 | 1.1 | 1.1 | .9 | 1.1 | 1.1 | 1.2 | .9 |
| .9 | 1.1 | 1.1 | 1.1 | .9 | .8 | .8 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.2 | 1.0 | 1.2 | 1.2 | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 | 1.2 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.2 | 1.2 | 1.1 |
| 1.1 | 1.1 | 1.2 | 1.1 | .9 | .8 | .8 | .9 | .8 | .9 | .9 | 1.5 | 1.4 | 1.1 | .8 | .8 | .8 | .9 | .7 | .8 | .6 | .7 | .7 | .6 | .7 | .8 | .8 | .7 | .7 | .7 | .8 | .9 | .9 | .9 | 1.0 | 1.0 |
| .5 | .5 | .6 | .7 | .8 | .8 | .8 | .8 | 1.0 | .9 | .9 | 1.0 | .8 | .6 | .5 | .8 | .5 | .5 | .5 | .5 | .4 | .4 | .3 | .3 | .4 | .5 | .4 | .4 | .4 | .4 | .4 | .3 | .4 | .4 | .5 | .5 |
| .5 | .5 | .5 | .5 | .6 | .6 | .7 | .8 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .6 | .5 | .5 | .4 | .4 | .4 | .4 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .4 | .5 | .5 | .5 |

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -.1 | -.1 | -.2 | -.2 | -.2 | -.2 | -.4 | -.5 | -.6 | -.5 | -.4 | -.5 | -.3 | -.8 | -.7 | -.4 | -.5 | -.6 | -.7 | -.7 | -.7 | -.5 | -.5 | -.7 | -.5 | -.3 | -.3 | -.4 | -.3 | -.3 | -.3 | -.2 | -.2 | -.1 | -.1 | .0 |
| -.1 | -.1 | -.1 | -.1 | -.1 | -.2 | .5 | .1 | .0 | .8 | -.3 | -.1 | -1.0 | -3.8 | -3.8 | -.4 | -.2 | .0 | .2 | .0 | .0 | -.1 | .0 | -.1 | -.1 | -.2 | -.2 | -.6 | -.7 | -.4 | -.3 | -.3 | -.4 | -.2 | -.1 | -.1 |
| .0 | -.2 | -.1 | -.1 | -.1 | -.4 | -.5 | -.4 | -.4 | -.1 | -.1 | .0 | .1 | -1.1 | -.1 | .1 | .0 | .1 | .0 | -.2 | .2 | -.2 | -.1 | -.1 | -.4 | -.5 | -.3 | -.4 | -.7 | -.6 | -.6 | -.9 | -.8 | -.4 | -.4 | -.3 |
| .3 | .2 | .1 | .2 | .1 | .0 | -.1 | -.3 | -.1 | .1 | .0 | .1 | .2 | .3 | .3 | .2 | .2 | .0 | .0 | .1 | .1 | -.1 | -.2 | -.2 | -.5 | -.3 | -.2 | -.2 | -.1 | -.1 | -.3 | -.3 | .2 | .0 | .1 | .2 |
| .2 | .3 | .3 | .3 | .3 | .0 | .0 | -.1 | .1 | .0 | .1 | .1 | .2 | .3 | .2 | .2 | .2 | .1 | .1 | .1 | .1 | -.1 | -.2 | -.2 | -.2 | .6 | .0 | .7 | 1.1 | .4 | .2 | .1 | .1 | .3 | .3 | .2 |
| .3 | .2 | .1 | .2 | .1 | .1 | .2 | .4 | .2 | .1 | .0 | .1 | .1 | .1 | .1 | .2 | .1 | .2 | .3 | .2 | .0 | .0 | .0 | .5 | .0 | -.9 | -1.1 | .1 | .9 | .3 | .1 | .0 | .2 | .3 | .2 | .2 |
| .1 | .0 | .1 | .1 | .1 | .1 | .1 | .5 | .1 | -.1 | .0 | .1 | .1 | .1 | .1 | .1 | .1 | .1 | .3 | .4 | .1 | .1 | .1 | .0 | .2 | .2 | -.1 | -.2 | .5 | .0 | .1 | .2 | .1 | .1 | .1 | .1 |
| .1 | .0 | .1 | .1 | .0 | .0 | .1 | .0 | .0 | .0 | .1 | .1 | .1 | .1 | .1 | .1 | .1 | -.2 | -.2 | .1 | .4 | .6 | .2 | .0 | .0 | .2 | .0 | -.2 | -.2 | .1 | .0 | .1 | .1 | .1 | .0 | .0 |
| -.2 | -.1 | -.1 | -.1 | -.1 | -.1 | .0 | -.1 | -.1 | .0 | -.2 | .1 | -.1 | .0 | .0 | .0 | -.1 | -.2 | -.2 | -.1 | .3 | .9 | .6 | .0 | .0 | -.1 | -.2 | -.8 | -.3 | -.3 | -.2 | -.1 | -.1 | -.1 | -.2 | -.3 |
| -.2 | -.1 | .0 | .0 | .0 | .1 | .1 | .1 | .1 | .1 | -.7 | -.8 | -.8 | -.5 | -.2 | -.1 | -.1 | -.1 | -.1 | -.4 | -.5 | .4 | .1 | .0 | -.1 | -.2 | -.2 | -.2 | -.3 | -.3 | -.2 | -.4 | -.5 | -.2 | -.4 | -.4 |
| -.2 | -.2 | -.2 | -.1 | .0 | .0 | .1 | .1 | .1 | .1 | .0 | -.2 | -.5 | -.2 | .0 | .0 | .0 | .0 | .0 | .5 | .2 | -.3 | -.2 | -.1 | .0 | -.1 | -.1 | .0 | .0 | .0 | .2 | .1 | -.1 | -.1 | -.1 | -.2 |
| .0 | -.1 | -.1 | -.1 | -.1 | .0 | .1 | .1 | .1 | .1 | .1 | .5 | -.2 | -.2 | .0 | .0 | .1 | .1 | .1 | .6 | .6 | .1 | .0 | .0 | .1 | .1 | .1 | .2 | .1 | .3 | .2 | .3 | .2 | .0 | .1 | .0 |
| .1 | .1 | .1 | .2 | .1 | .1 | .1 | .1 | .1 | .2 | .2 | .2 | .0 | .1 | .1 | .0 | .0 | .1 | .1 | .2 | .3 | .0 | .1 | .1 | .1 | .2 | .2 | .2 | .2 | .1 | .2 | .2 | .3 | .1 | .2 | .0 |
| .1 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .3 | .2 | .2 | .2 | .2 | .1 | .2 | .3 | .3 | .3 | .2 | .1 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .1 | .1 |
| .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .1 | .1 | .2 | .3 | .2 | .3 | .2 | .2 | .3 | .3 | .3 | .3 | .2 | .3 | .2 | .2 | .3 | .2 | .3 | .3 | .2 | .2 | .2 | .2 | .2 | .2 |
| .2 | .2 | .2 | .3 | .3 | .2 | .2 | .2 | .2 | .2 | .2 | .1 | .2 | .0 | .0 | .1 | .2 | .2 | .2 | .2 | .2 | .1 | .0 | -.1 | .0 | .1 | .0 | -.1 | -.1 | .0 | .0 | .0 | -.1 | .0 | .1 | .2 |
| -.1 | .0 | -.1 | -.4 | -.5 | -.7 | -.5 | -.4 | -.4 | .0 | .0 | -.3 | -.2 | .0 | -.1 | -.4 | -.5 | -1.6 | -2.5 | -2.6 | -2.3 | -2.1 | -2.0 | -1.7 | -1.6 | -1.9 | -2.1 | -1.9 | -2.5 | -2.8 | -2.7 | -1.9 | -1.5 | -1.2 | -.3 | -.2 |
| -.7 | -.7 | -.7 | -.5 | -.5 | -.5 | -.7 | -1.2 | -.8 | .1 | -.1 | -.4 | -.4 | -.3 | -.6 | -.9 | -1.4 | -2.3 | -3.1 | -3.4 | -3.3 | -3.4 | -4.0 | -4.0 | -4.0 | -4.4 | -4.8 | -4.8 | -4.7 | -4.1 | -3.7 | -3.2 | -2.7 | -1.2 | -1.0 | -.8 |

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

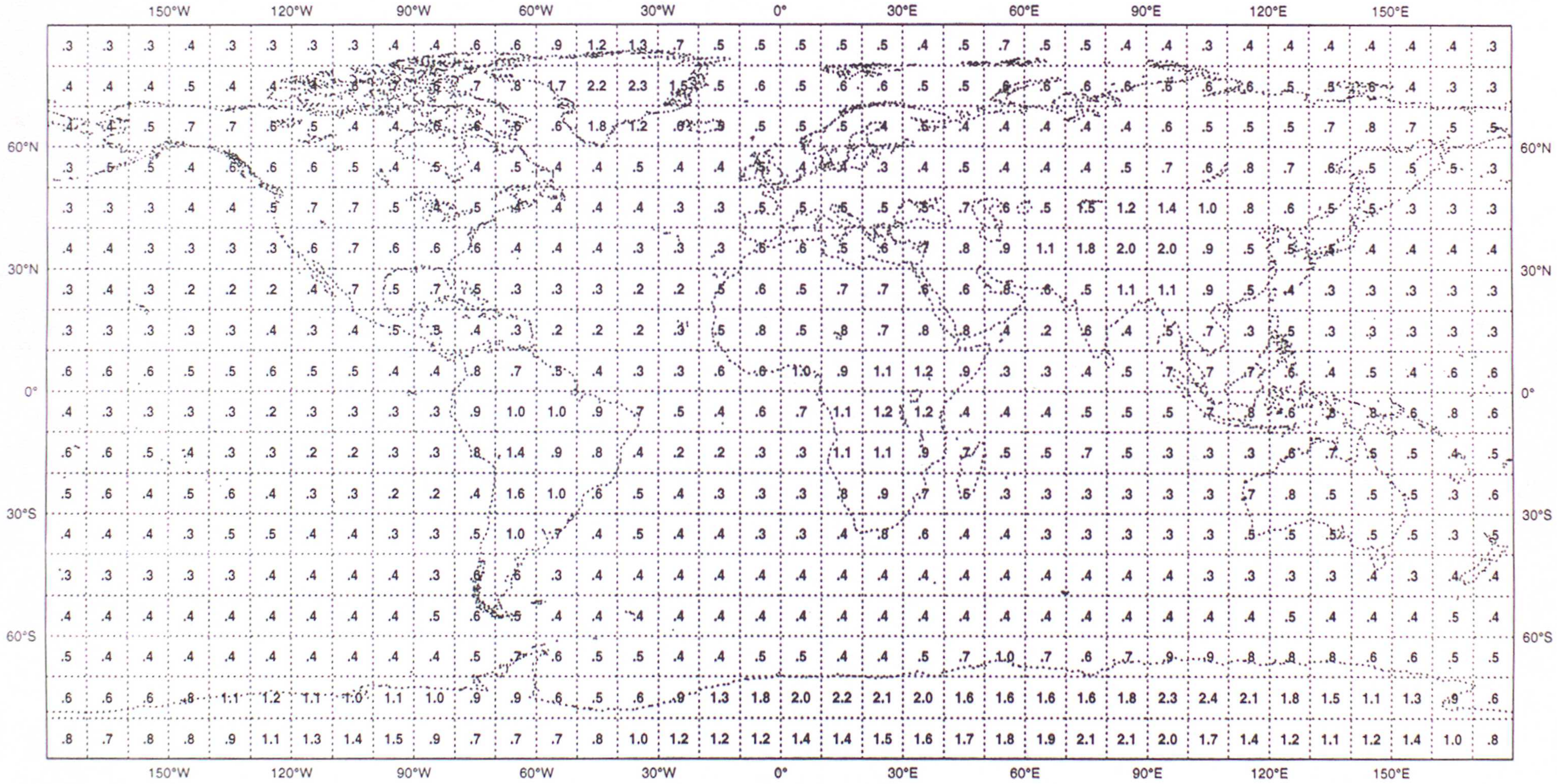

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.3 .3 .3 .4 .3 .3 .3 .3 .4 .4 .6 .6 .9 1.2 1.3 .7 .5 .5 .5 .5 .5 .4 .5 .7 .5 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3
.4 .4 .4 .5 .4 .4 .4 .3 .7 .5 .7 .8 1.7 2.2 2.3 1.5 .5 .6 .5 .6 .6 .5 .5 .6 .6 .6 .6 .6 .6 .6 .5 .5 .6 .4 .3 .3
.4 .4 .5 .7 .7 .6 .5 .4 .4 .6 .6 .6 .6 1.8 1.2 .6 .9 .5 .5 .5 .4 .5 .4 .4 .4 .4 .4 .6 .5 .5 .5 .7 .8 .7 .5 .5
.3 .5 .5 .4 .6 .6 .6 .5 .4 .5 .4 .5 .4 .4 .5 .4 .4 .5 .4 .4 .3 .4 .5 .4 .4 .4 .5 .7 .6 .8 .7 .6 .5 .5 .5 .3
.3 .3 .3 .4 .4 .5 .7 .7 .5 .4 .5 .4 .4 .4 .4 .3 .3 .5 .5 .6 .5 .5 .7 .6 .5 1.5 1.2 1.4 1.0 .8 .6 .5 .5 .3 .3 .3
.4 .4 .3 .3 .3 .3 .6 .7 .6 .6 .6 .4 .4 .4 .3 .3 .3 .6 .6 .5 .6 .7 .8 .9 1.1 1.8 2.0 2.0 .9 .5 .5 .5 .4 .4 .4 .4
.3 .4 .3 .2 .2 .2 .4 .7 .5 .7 .5 .3 .3 .3 .2 .2 .5 .6 .5 .7 .7 .6 .6 .8 .6 .5 1.1 1.1 .9 .5 .4 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .4 .3 .4 .5 .3 .4 .3 .2 .2 .2 .3 .5 .8 .5 .8 .7 .8 .8 .4 .2 .6 .4 .5 .7 .3 .5 .3 .3 .3 .3 .3
.6 .6 .6 .5 .5 .6 .5 .5 .4 .4 .8 .7 .5 .4 .3 .3 .6 .6 1.0 .9 1.1 1.2 .9 .3 .3 .4 .5 .7 .7 .7 .6 .4 .5 .4 .6 .6
.4 .3 .3 .3 .3 .2 .3 .3 .3 .3 .9 1.0 1.0 .9 .7 .5 .4 .6 .7 1.1 1.2 1.2 .4 .4 .4 .5 .5 .5 .7 .8 .6 .8 .8 .6 .8 .6
.6 .6 .5 .4 .3 .3 .2 .2 .3 .3 .8 1.4 .9 .8 .4 .2 .2 .3 .3 1.1 1.1 .9 .7 .5 .5 .7 .5 .3 .3 .3 .6 .7 .5 .5 .4 .5
.5 .6 .4 .5 .6 .4 .3 .3 .2 .2 .4 1.6 1.0 .6 .5 .4 .3 .3 .3 .8 .9 .7 .6 .3 .3 .3 .3 .3 .3 .7 .8 .5 .5 .5 .3 .6
.4 .4 .4 .3 .5 .5 .4 .4 .3 .3 .5 1.0 .7 .4 .5 .4 .4 .3 .3 .4 .8 .6 .4 .4 .3 .3 .3 .3 .3 .5 .5 .5 .5 .5 .3 .5
.3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .6 .6 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .4 .3 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .6 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .5 .4
.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .7 .6 .5 .5 .4 .4 .5 .5 .4 .4 .5 .7 1.0 .7 .6 .7 .9 .9 .8 .8 .8 .6 .6 .5 .5
.6 .6 .6 .8 1.1 1.2 1.1 1.0 1.1 1.0 .9 .9 .6 .5 .6 .9 1.3 1.8 2.0 2.2 2.1 2.0 1.6 1.6 1.6 1.6 1.8 2.3 2.4 2.1 1.8 1.5 1.1 1.3 .9 .6
.8 .7 .8 .8 .9 1.1 1.3 1.4 1.5 .9 .7 .7 .7 .8 1.0 1.2 1.2 1.2 1.4 1.4 1.5 1.6 1.7 1.8 1.9 2.1 2.1 2.0 1.7 1.4 1.2 1.1 1.2 1.4 1.0 .8

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

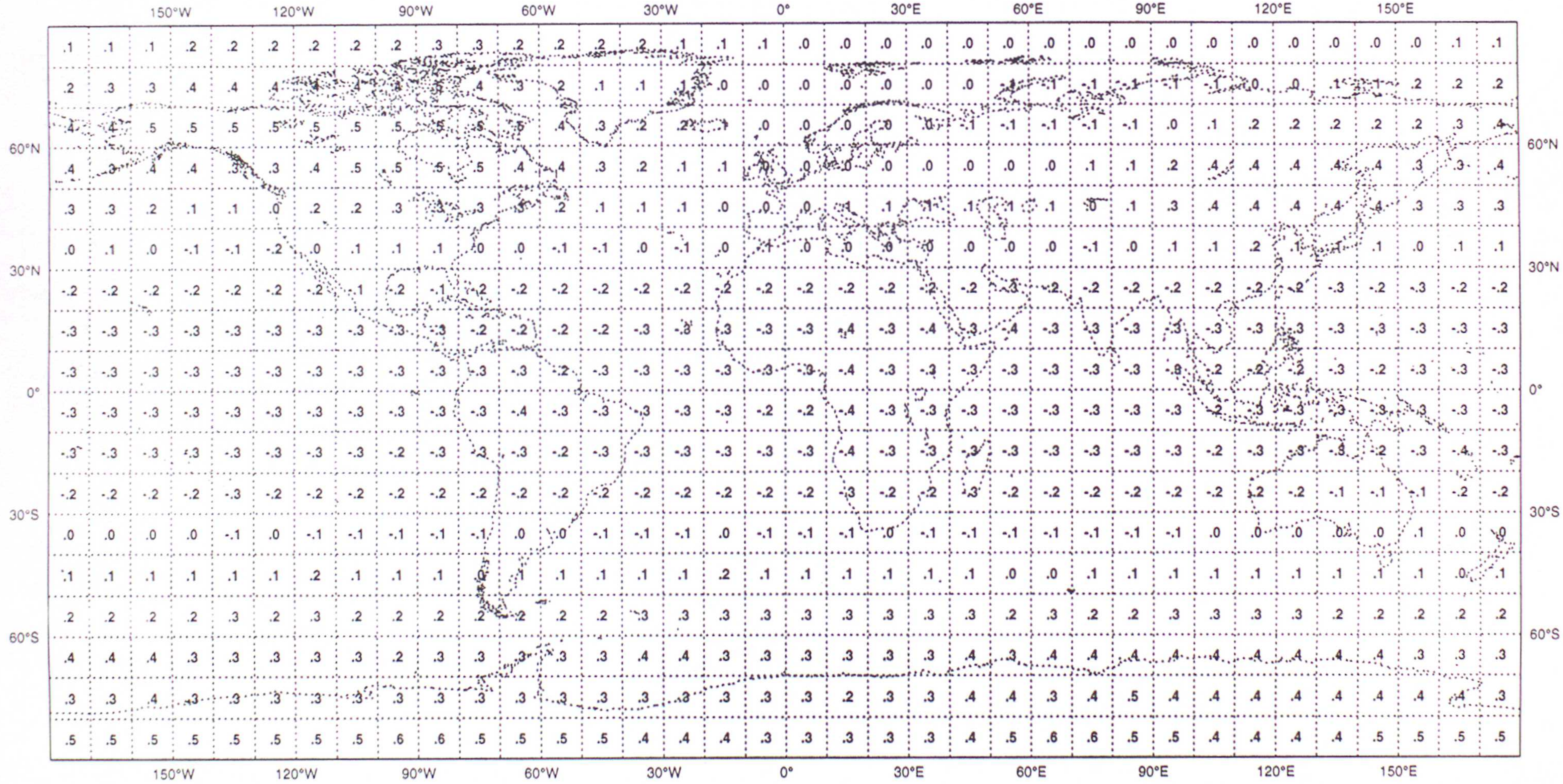

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

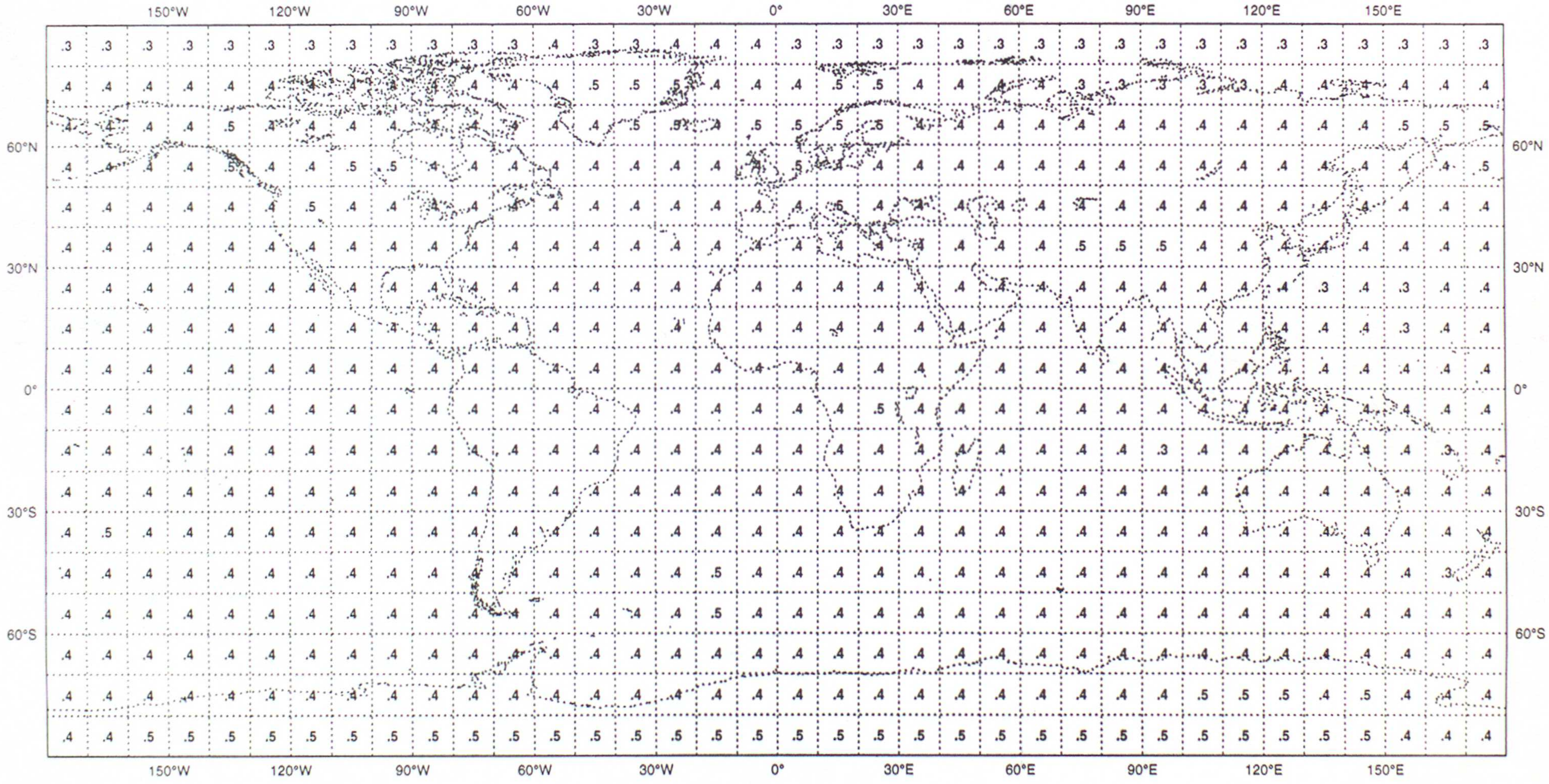

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

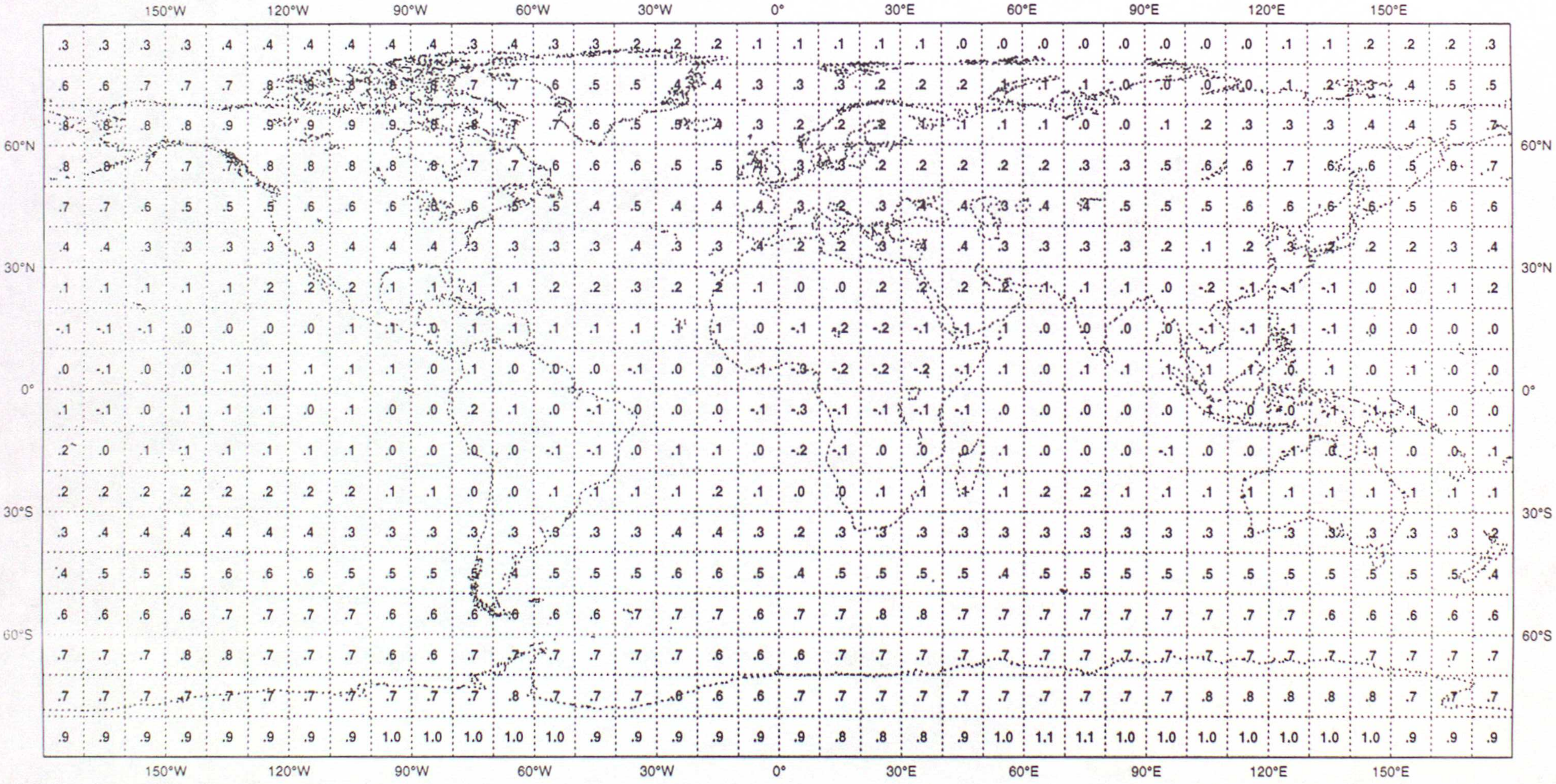

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3 .2 .2 .2 .1 .1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .2 .2 .2 .3
.6 .6 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .6 .5 .5 .4 .4 .3 .3 .3 .2 .2 .2 .1 .1 .1 .0 .0 .0 .0 .1 .2 .3 .4 .5 .5
.8 .8 .8 .8 .9 .9 .9 .9 .9 .8 .8 .7 .7 .6 .5 .5 .4 .3 .2 .2 .2 .1 .1 .1 .1 .0 .0 .1 .2 .3 .3 .3 .4 .4 .5 .7
.8 .8 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .6 .6 .6 .5 .5 .4 .3 .3 .2 .2 .2 .2 .2 .3 .3 .5 .6 .6 .7 .6 .6 .5 .8 .7
.7 .7 .6 .5 .5 .5 .6 .6 .6 .6 .6 .5 .5 .4 .5 .4 .4 .4 .3 .2 .3 .4 .4 .3 .4 .4 .5 .5 .5 .6 .6 .6 .6 .5 .6 .6
.4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .4 .3 .3 .4 .2 .2 .3 .4 .4 .3 .3 .3 .3 .2 .1 .2 .3 .2 .2 .2 .3 .4
.1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .3 .2 .2 .1 .0 .0 .2 .2 .2 .2 .1 .1 .1 .0 -.2 -.1 -.1 -.1 .0 .0 .1 .2
-.1 -.1 -.1 .0 .0 .0 .0 .1 .1 .0 .1 .1 .1 .1 .1 .1 .1 .0 -.1 -.2 -.2 -.1 -.1 .1 .0 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0
.0 -.1 .0 .0 .1 .1 .1 .1 .1 .0 .1 .0 .0 .0 -.1 .0 .0 -.1 -.3 -.2 -.2 -.2 -.1 .1 .0 .1 .1 .1 .1 .1 .0 .1 .0 .1 .0 .0
.1 -.1 .0 .1 .1 .1 .0 .1 .0 .0 .2 .1 .0 -.1 .0 .0 .0 -.1 -.3 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .0 .1 .0 .0 -.1 -.1 .1 .0 .0
.2 .0 .1 .1 .1 .1 .1 .1 .0 .0 .0 .0 -.1 -.1 .0 .1 .1 .0 -.2 -.1 .0 .0 .0 .1 .0 .0 .0 -.1 .0 .0 -.1 .0 -.1 .0 .0 .1
.2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .0 .0 .1 .1 .1 .1 .2 .1 .0 .0 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1
.3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.4 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .4 .5 .5 .5 .6 .6 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4
.6 .6 .6 .6 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .7 .7 .7 .6 .7 .7 .8 .8 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6
.7 .7 .7 .8 .8 .7 .7 .7 .6 .6 .7 .7 .7 .7 .7 .7 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .7 .7 .7 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .7
.9 .9 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .8 .8 .8 .9 1.0 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

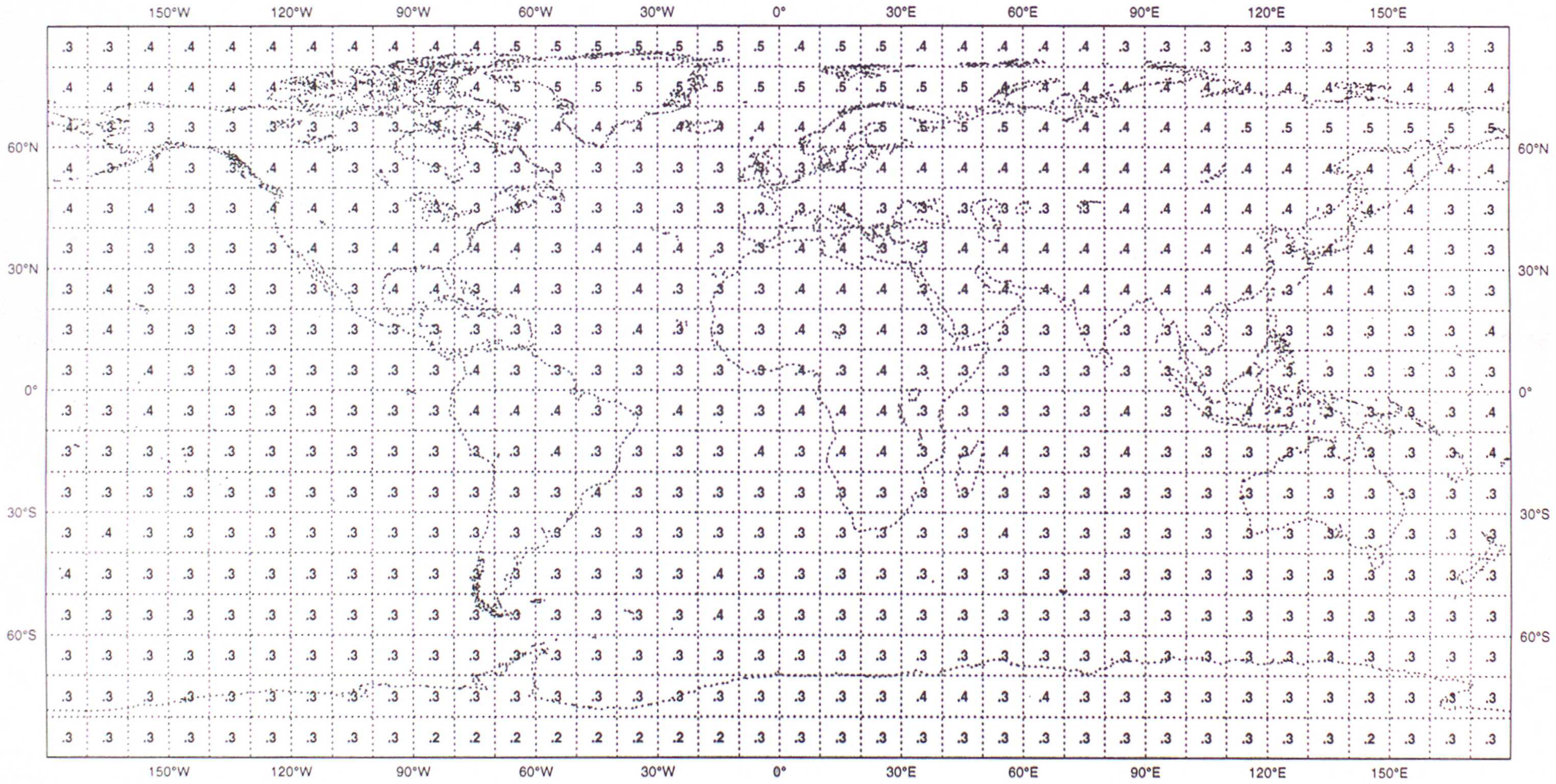
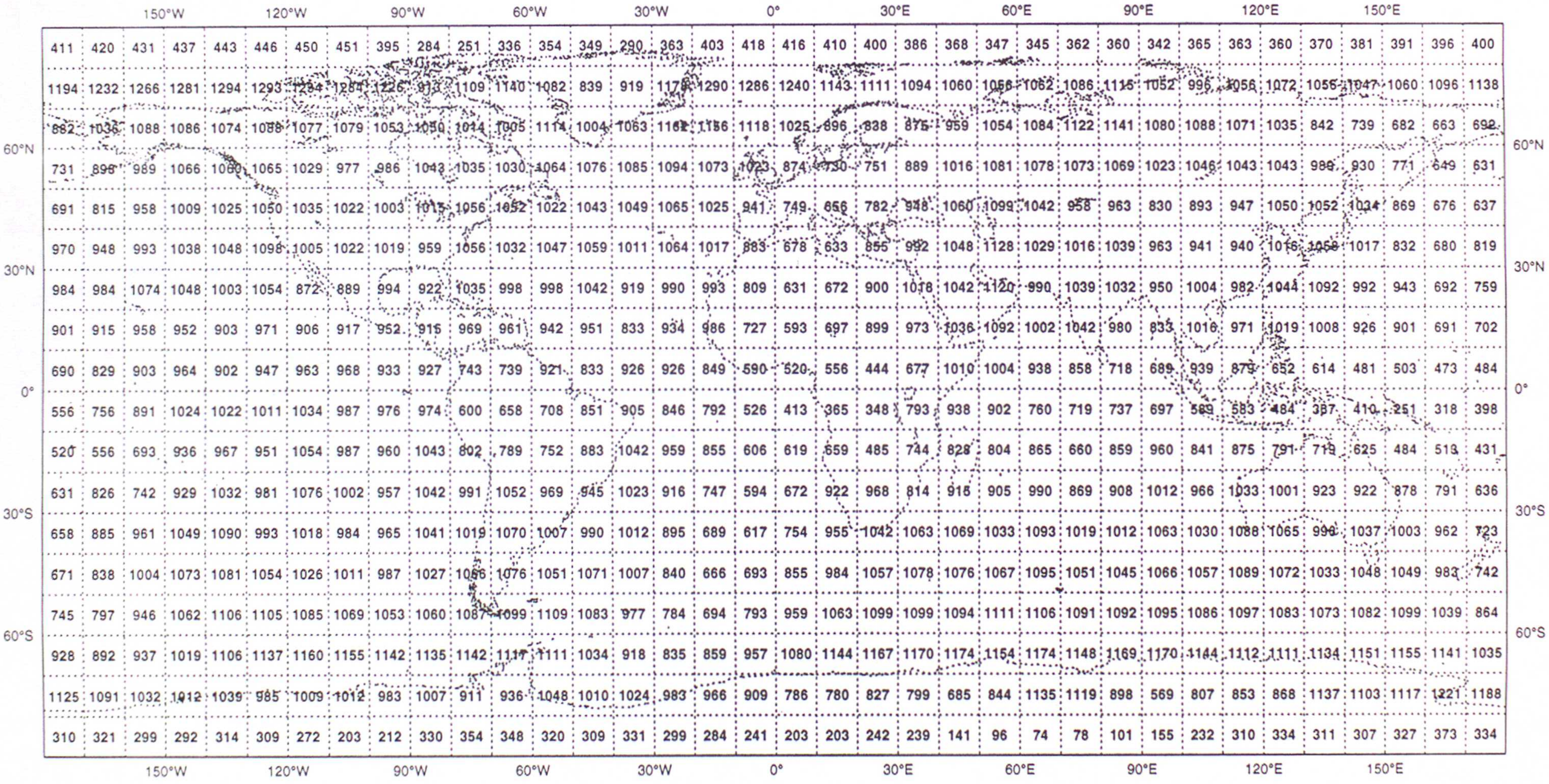

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 55. ATOVS mean daily count. MARCH 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 566638



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 411 | 420 | 431 | 437 | 443 | 446 | 450 | 451 | 395 | 284 | 251 | 336 | 354 | 349 | 290 | 363 | 403 | 418 | 416 | 410 | 400 | 386 | 368 | 347 | 345 | 362 | 360 | 342 | 365 | 363 | 360 | 370 | 381 | 391 | 396 | 400 |
| 1194 | 1232 | 1266 | 1281 | 1294 | 1293 | 1234 | 1284 | 1226 | 913 | 1109 | 1140 | 1082 | 839 | 919 | 1178 | 1290 | 1286 | 1240 | 1143 | 1111 | 1094 | 1060 | 1056 | 1062 | 1086 | 1115 | 1052 | 996 | 1056 | 1072 | 1056 | 1047 | 1060 | 1096 | 1138 |
| 882 | 1036 | 1088 | 1086 | 1074 | 1088 | 1077 | 1079 | 1053 | 1050 | 1014 | 1005 | 1114 | 1004 | 1063 | 1162 | 1156 | 1118 | 1025 | 896 | 838 | 875 | 959 | 1054 | 1084 | 1122 | 1141 | 1080 | 1088 | 1071 | 1035 | 842 | 739 | 682 | 663 | 692 |
| 731 | 898 | 989 | 1066 | 1060 | 1065 | 1029 | 977 | 986 | 1043 | 1035 | 1030 | 1064 | 1076 | 1085 | 1094 | 1073 | 1023 | 874 | 730 | 751 | 889 | 1016 | 1081 | 1078 | 1073 | 1069 | 1023 | 1046 | 1043 | 1043 | 989 | 930 | 771 | 649 | 631 |
| 691 | 815 | 958 | 1009 | 1025 | 1050 | 1035 | 1022 | 1003 | 1015 | 1056 | 1052 | 1022 | 1043 | 1049 | 1065 | 1025 | 941 | 749 | 656 | 782 | 948 | 1060 | 1099 | 1042 | 958 | 963 | 830 | 893 | 947 | 1050 | 1052 | 1034 | 869 | 676 | 637 |
| 970 | 948 | 993 | 1038 | 1048 | 1098 | 1005 | 1022 | 1019 | 959 | 1056 | 1032 | 1047 | 1059 | 1011 | 1064 | 1017 | 883 | 678 | 633 | 855 | 992 | 1048 | 1128 | 1029 | 1016 | 1039 | 963 | 941 | 940 | 1016 | 1058 | 1017 | 832 | 680 | 819 |
| 984 | 984 | 1074 | 1048 | 1003 | 1054 | 872 | 889 | 994 | 922 | 1035 | 998 | 998 | 1042 | 919 | 990 | 993 | 809 | 631 | 672 | 900 | 1018 | 1042 | 1120 | 990 | 1039 | 1032 | 950 | 1004 | 982 | 1044 | 1092 | 992 | 943 | 692 | 759 |
| 901 | 915 | 958 | 952 | 903 | 971 | 906 | 917 | 952 | 915 | 969 | 961 | 942 | 951 | 833 | 934 | 986 | 727 | 593 | 697 | 899 | 973 | 1036 | 1092 | 1002 | 1042 | 980 | 833 | 1016 | 971 | 1019 | 1008 | 926 | 901 | 691 | 702 |
| 690 | 829 | 903 | 964 | 902 | 947 | 963 | 968 | 933 | 927 | 743 | 739 | 921 | 833 | 926 | 926 | 849 | 590 | 520 | 556 | 444 | 677 | 1010 | 1004 | 938 | 858 | 718 | 689 | 939 | 879 | 652 | 614 | 481 | 503 | 473 | 484 |
| 556 | 756 | 891 | 1024 | 1022 | 1011 | 1034 | 987 | 976 | 974 | 600 | 658 | 708 | 851 | 905 | 846 | 792 | 526 | 413 | 365 | 348 | 793 | 938 | 902 | 760 | 719 | 737 | 697 | 589 | 583 | 484 | 387 | 410 | 251 | 318 | 398 |
| 520 | 556 | 693 | 936 | 967 | 951 | 1054 | 987 | 960 | 1043 | 802 | 789 | 752 | 883 | 1042 | 959 | 855 | 606 | 619 | 659 | 485 | 744 | 828 | 804 | 865 | 660 | 859 | 960 | 841 | 875 | 791 | 719 | 625 | 484 | 513 | 431 |
| 631 | 826 | 742 | 929 | 1032 | 981 | 1076 | 1002 | 957 | 1042 | 991 | 1052 | 969 | 945 | 1023 | 916 | 747 | 594 | 672 | 922 | 968 | 814 | 916 | 905 | 990 | 869 | 908 | 1012 | 966 | 1033 | 1001 | 923 | 922 | 878 | 791 | 636 |
| 658 | 885 | 961 | 1049 | 1090 | 993 | 1018 | 984 | 965 | 1041 | 1019 | 1070 | 1007 | 990 | 1012 | 895 | 689 | 617 | 754 | 955 | 1042 | 1063 | 1069 | 1033 | 1093 | 1019 | 1012 | 1063 | 1030 | 1088 | 1065 | 996 | 1037 | 1003 | 962 | 723 |
| 671 | 838 | 1004 | 1073 | 1081 | 1054 | 1026 | 1011 | 987 | 1027 | 1066 | 1076 | 1051 | 1071 | 1007 | 840 | 666 | 693 | 855 | 984 | 1057 | 1078 | 1076 | 1067 | 1095 | 1051 | 1045 | 1066 | 1057 | 1089 | 1072 | 1033 | 1048 | 1049 | 983 | 742 |
| 745 | 797 | 946 | 1062 | 1106 | 1105 | 1085 | 1069 | 1053 | 1060 | 1087 | 1099 | 1109 | 1083 | 977 | 784 | 694 | 793 | 959 | 1063 | 1099 | 1099 | 1094 | 1111 | 1106 | 1091 | 1092 | 1095 | 1086 | 1097 | 1083 | 1073 | 1082 | 1099 | 1039 | 864 |
| 928 | 892 | 937 | 1019 | 1106 | 1137 | 1160 | 1155 | 1142 | 1135 | 1142 | 1117 | 1111 | 1034 | 918 | 835 | 859 | 957 | 1080 | 1144 | 1167 | 1170 | 1174 | 1154 | 1174 | 1148 | 1169 | 1170 | 1144 | 1112 | 1111 | 1134 | 1151 | 1155 | 1141 | 1035 |
| 1125 | 1091 | 1032 | 1012 | 1039 | 985 | 1009 | 1012 | 983 | 1007 | 911 | 936 | 1048 | 1010 | 1024 | 983 | 966 | 909 | 786 | 780 | 827 | 799 | 685 | 844 | 1135 | 1119 | 898 | 569 | 807 | 853 | 868 | 1137 | 1103 | 1117 | 1221 | 1188 |
| 310 | 321 | 299 | 292 | 314 | 309 | 272 | 203 | 212 | 330 | 354 | 348 | 320 | 309 | 331 | 299 | 284 | 241 | 203 | 203 | 242 | 239 | 141 | 96 | 74 | 78 | 101 | 155 | 232 | 310 | 334 | 311 | 307 | 327 | 373 | 334 |

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations

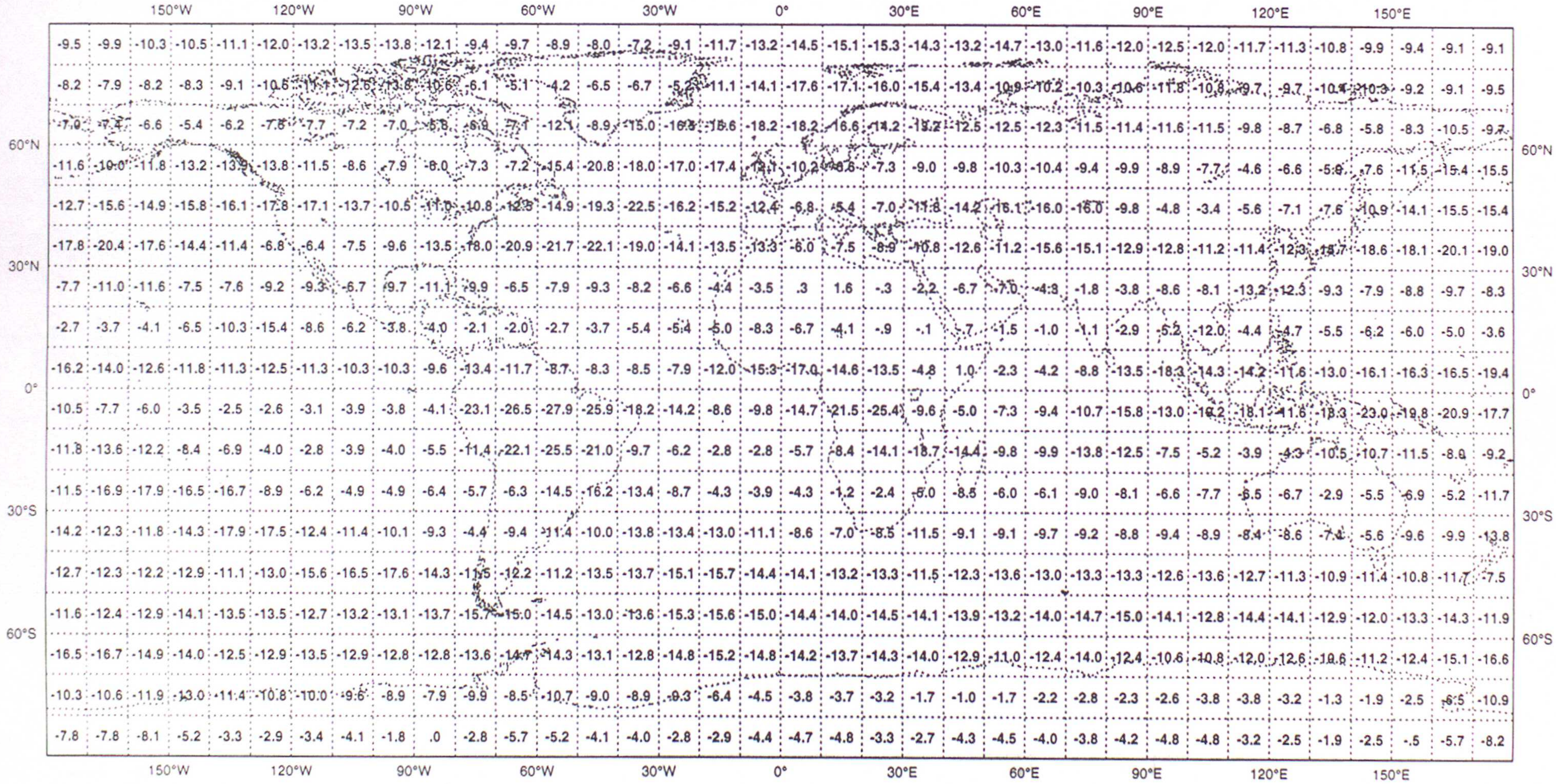
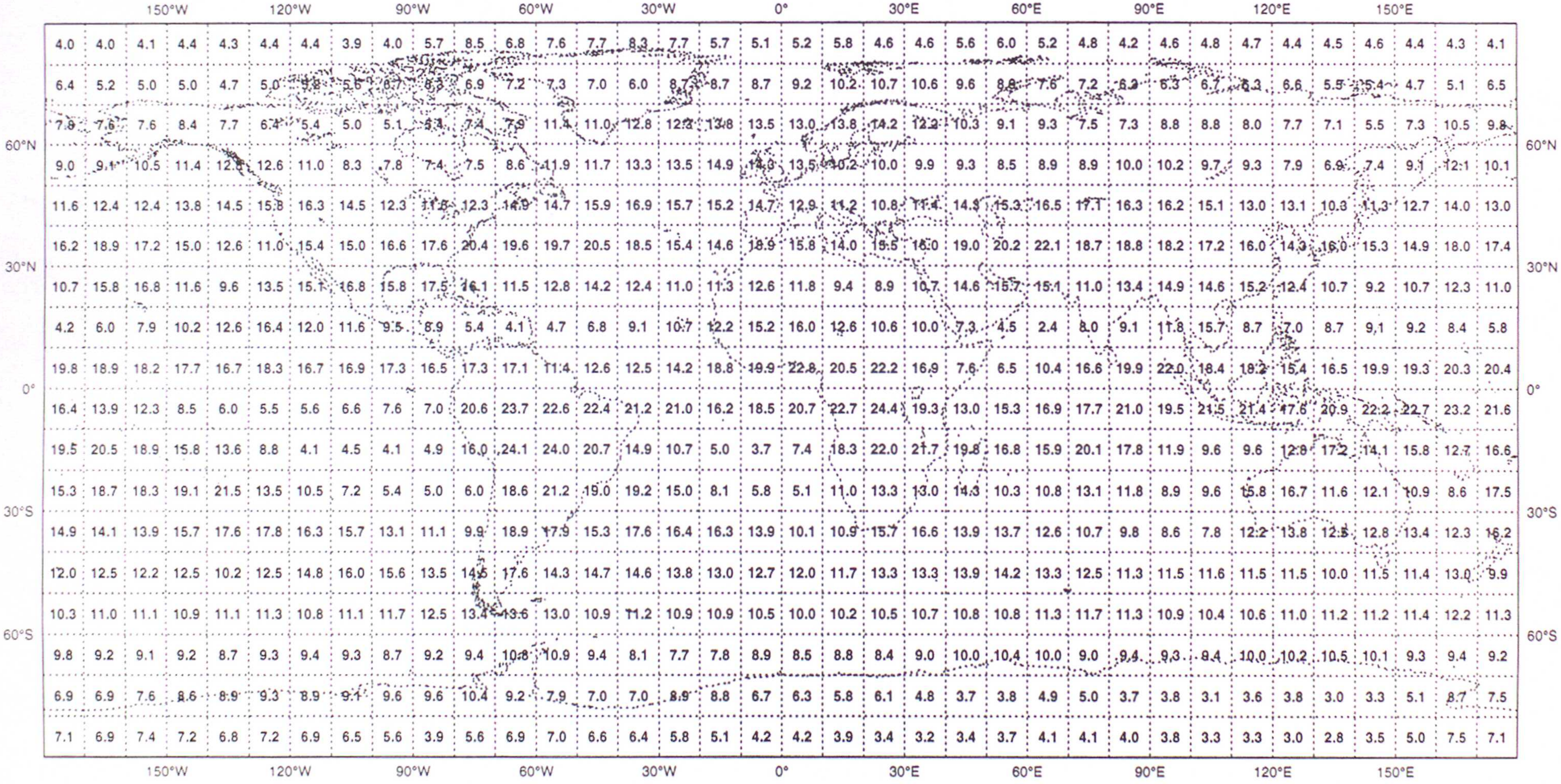

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-9.5 -9.9 -10.3 -10.5 -11.1 -12.0 -13.2 -13.5 -13.8 -12.1 -9.4 -9.7 -8.9 -8.0 -7.2 -9.1 -11.7 -13.2 -14.5 -15.1 -15.3 -14.3 -13.2 -14.7 -13.0 -11.6 -12.0 -12.5 -12.0 -11.7 -11.3 -10.8 -9.9 -9.4 -9.1 -9.1
-8.2 -7.9 -8.2 -8.3 -9.1 -10.6 -11.1 -12.6 -13.8 -10.6 -6.1 -5.1 -4.2 -6.5 -6.7 -5.2 -11.1 -14.1 -17.6 -17.1 -16.0 -15.4 -13.4 -10.9 -10.2 -10.3 -10.6 -11.8 -10.8 -9.7 -9.7 -10.4 -10.3 -9.2 -9.1 -9.5
-7.0 -7.4 -6.6 -5.4 -6.2 -7.6 -7.7 -7.2 -7.0 -5.8 -6.9 -7.1 -12.1 -8.9 -15.0 -16.5 -16.6 -18.2 -18.2 -16.6 -14.2 -13.2 -12.5 -12.5 -12.3 -11.5 -11.4 -11.6 -11.5 -9.8 -8.7 -6.8 -5.8 -8.3 -10.5 -9.7
-11.6 -10.0 -11.8 -13.2 -13.9 -13.8 -11.5 -8.6 -7.9 -8.0 -7.3 -7.2 -15.4 -20.8 -18.0 -17.0 -17.4 -12.1 -10.2 -8.6 -7.3 -9.0 -9.8 -10.3 -10.4 -9.4 -9.9 -8.9 -7.7 -4.6 -6.6 -5.9 -7.6 -11.5 -15.4 -15.5
-12.7 -15.6 -14.9 -15.8 -16.1 -17.8 -17.1 -13.7 -10.5 -11.0 -10.8 -12.8 -14.9 -19.3 -22.5 -16.2 -15.2 -12.4 -6.8 -5.4 -7.0 -11.8 -14.2 -16.1 -16.0 -16.0 -9.8 -4.8 -3.4 -5.6 -7.1 -7.6 -10.9 -14.1 -15.5 -15.4
-17.8 -20.4 -17.6 -14.4 -11.4 -6.8 -6.4 -7.5 -9.6 -13.5 -18.0 -20.9 -21.7 -22.1 -19.0 -14.1 -13.5 -13.3 -6.0 -7.5 -8.9 -10.8 -12.6 -11.2 -15.6 -15.1 -12.9 -12.8 -11.2 -11.4 -12.3 -15.7 -18.6 -18.1 -20.1 -19.0
-7.7 -11.0 -11.6 -7.5 -7.6 -9.2 -9.3 -6.7 -9.7 -11.1 -9.9 -6.5 -7.9 -9.3 -8.2 -6.6 -4.4 -3.5 .3 1.6 -.3 -2.2 -6.7 -7.0 -4.3 -1.8 -3.8 -8.6 -8.1 -13.2 -12.3 -9.3 -7.9 -8.8 -9.7 -8.3
-2.7 -3.7 -4.1 -6.5 -10.3 -15.4 -8.6 -6.2 -3.8 -4.0 -2.1 -2.0 -2.7 -3.7 -5.4 -5.4 -5.0 -8.3 -6.7 -4.1 -.9 -.1 -.7 -1.5 -1.0 -1.1 -2.9 -5.2 -12.0 -4.4 -4.7 -5.5 -6.2 -6.0 -5.0 -3.6
-16.2 -14.0 -12.6 -11.8 -11.3 -12.5 -11.3 -10.3 -10.3 -9.6 -13.4 -11.7 -8.7 -8.3 -8.5 -7.9 -12.0 -15.3 -17.0 -14.6 -13.5 -4.8 1.0 -2.3 -4.2 -8.8 -13.5 -18.3 -14.3 -14.2 -11.6 -13.0 -16.1 -16.3 -16.5 -19.4
-10.5 -7.7 -6.0 -3.5 -2.5 -2.6 -3.1 -3.9 -3.8 -4.1 -23.1 -26.5 -27.9 -25.9 -18.2 -14.2 -8.6 -9.8 -14.7 -21.5 -25.4 -9.6 -5.0 -7.3 -9.4 -10.7 -15.8 -13.0 -16.2 -18.1 -11.6 -18.3 -23.0 -19.8 -20.9 -17.7
-11.8 -13.6 -12.2 -8.4 -6.9 -4.0 -2.8 -3.9 -4.0 -5.5 -11.4 -22.1 -25.5 -21.0 -9.7 -6.2 -2.8 -2.8 -5.7 -8.4 -14.1 -18.7 -14.4 -9.8 -9.9 -13.8 -12.5 -7.5 -5.2 -3.9 -4.3 -10.5 -10.7 -11.5 -8.9 -9.2
-11.5 -16.9 -17.9 -16.5 -16.7 -8.9 -6.2 -4.9 -4.9 -6.4 -5.7 -6.3 -14.5 -16.2 -13.4 -8.7 -4.3 -3.9 -4.3 -1.2 -2.4 -6.0 -8.5 -6.0 -6.1 -9.0 -8.1 -6.6 -7.7 -6.5 -6.7 -2.9 -5.5 -6.9 -5.2 -11.7
-14.2 -12.3 -11.8 -14.3 -17.9 -17.5 -12.4 -11.4 -10.1 -9.3 -4.4 -9.4 -11.4 -10.0 -13.8 -13.4 -13.0 -11.1 -8.6 -7.0 -8.5 -11.5 -9.1 -9.1 -9.7 -9.2 -8.8 -9.4 -8.9 -8.4 -8.6 -7.4 -5.6 -9.6 -9.9 -13.8
-12.7 -12.3 -12.2 -12.9 -11.1 -13.0 -15.6 -16.5 -17.6 -14.3 -11.5 -12.2 -11.2 -13.5 -13.7 -15.1 -15.7 -14.4 -14.1 -13.2 -13.3 -11.5 -12.3 -13.6 -13.0 -13.3 -13.3 -12.6 -13.6 -12.7 -11.3 -10.9 -11.4 -10.8 -11.7 -7.5
-11.6 -12.4 -12.9 -14.1 -13.5 -13.5 -12.7 -13.2 -13.1 -13.7 -15.7 -15.0 -14.5 -13.0 -13.6 -15.3 -15.6 -15.0 -14.4 -14.0 -14.5 -14.1 -13.9 -13.2 -14.0 -14.7 -15.0 -14.1 -12.8 -14.4 -14.1 -12.9 -12.0 -13.3 -14.3 -11.9
-16.5 -16.7 -14.9 -14.0 -12.5 -12.9 -13.5 -12.9 -12.8 -12.8 -13.6 -14.7 -14.3 -13.1 -12.8 -14.8 -15.2 -14.8 -14.2 -13.7 -14.3 -14.0 -12.9 -11.0 -12.4 -14.0 -12.4 -10.6 -10.8 -12.0 -12.6 -10.6 -11.2 -12.4 -15.1 -16.6
-10.3 -10.6 -11.9 -13.0 -11.4 -10.8 -10.0 -9.6 -8.9 -7.9 -9.9 -8.5 -10.7 -9.0 -8.9 -9.3 -6.4 -4.5 -3.8 -3.7 -3.2 -1.7 -1.0 -1.7 -2.2 -2.8 -2.3 -2.6 -3.8 -3.8 -3.2 -1.3 -1.9 -2.5 -6.5 -10.9
-7.8 -7.8 -8.1 -5.2 -3.3 -2.9 -3.4 -4.1 -1.8 .0 -2.8 -5.7 -5.2 -4.1 -4.0 -2.8 -2.9 -4.4 -4.7 -4.8 -3.3 -2.7 -4.3 -4.5 -4.0 -3.8 -4.2 -4.8 -4.8 -3.2 -2.5 -1.9 -2.5 -.5 -5.7 -8.2

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.0 | 4.0 | 4.1 | 4.4 | 4.3 | 4.4 | 4.4 | 3.9 | 4.0 | 5.7 | 8.5 | 6.8 | 7.6 | 7.7 | 8.3 | 7.7 | 5.7 | 5.1 | 5.2 | 5.8 | 4.6 | 4.6 | 5.6 | 6.0 | 5.2 | 4.8 | 4.2 | 4.6 | 4.8 | 4.7 | 4.4 | 4.5 | 4.6 | 4.4 | 4.3 | 4.1 |
| 6.4 | 5.2 | 5.0 | 5.0 | 4.7 | 5.0 | 5.8 | 5.6 | 8.7 | 8.3 | 6.9 | 7.2 | 7.3 | 7.0 | 6.0 | 8.7 | 8.7 | 8.7 | 9.2 | 10.2 | 10.7 | 10.6 | 9.6 | 8.8 | 7.6 | 7.2 | 6.2 | 6.3 | 6.7 | 6.3 | 6.6 | 5.5 | 5.4 | 4.7 | 5.1 | 6.5 |
| 7.9 | 7.6 | 7.6 | 8.4 | 7.7 | 6.4 | 5.4 | 5.0 | 5.1 | 5.4 | 7.4 | 7.9 | 11.4 | 11.0 | 12.8 | 12.3 | 13.8 | 13.5 | 13.0 | 13.8 | 14.2 | 12.2 | 10.3 | 9.1 | 9.3 | 7.5 | 7.3 | 8.8 | 8.8 | 8.0 | 7.7 | 7.1 | 5.5 | 7.3 | 10.5 | 9.8 |
| 9.0 | 9.1 | 10.5 | 11.4 | 12.8 | 12.6 | 11.0 | 8.3 | 7.8 | 7.4 | 7.5 | 8.6 | 11.9 | 11.7 | 13.3 | 13.5 | 14.9 | 14.0 | 13.5 | 10.2 | 10.0 | 9.9 | 9.3 | 8.5 | 8.9 | 8.9 | 10.0 | 10.2 | 9.7 | 9.3 | 7.9 | 6.9 | 7.4 | 9.1 | 12.1 | 10.1 |
| 11.6 | 12.4 | 12.4 | 13.8 | 14.5 | 15.8 | 16.3 | 14.5 | 12.3 | 11.6 | 12.3 | 14.9 | 14.7 | 15.9 | 16.9 | 15.7 | 15.2 | 14.7 | 12.9 | 11.2 | 10.8 | 11.4 | 14.3 | 15.3 | 16.5 | 17.1 | 16.3 | 16.2 | 15.1 | 13.0 | 13.1 | 10.3 | 11.3 | 12.7 | 14.0 | 13.0 |
| 16.2 | 18.9 | 17.2 | 15.0 | 12.6 | 11.0 | 15.4 | 15.0 | 16.6 | 17.6 | 20.4 | 19.6 | 19.7 | 20.5 | 18.5 | 15.4 | 14.6 | 18.9 | 15.8 | 14.0 | 15.5 | 16.0 | 19.0 | 20.2 | 22.1 | 18.7 | 18.8 | 18.2 | 17.2 | 16.0 | 14.3 | 16.0 | 15.3 | 14.9 | 18.0 | 17.4 |
| 10.7 | 15.8 | 16.8 | 11.6 | 9.6 | 13.5 | 15.1 | 16.8 | 15.8 | 17.5 | 16.1 | 11.5 | 12.8 | 14.2 | 12.4 | 11.0 | 11.3 | 12.6 | 11.8 | 9.4 | 8.9 | 10.7 | 14.6 | 15.7 | 15.1 | 11.0 | 13.4 | 14.9 | 14.6 | 15.2 | 12.4 | 10.7 | 9.2 | 10.7 | 12.3 | 11.0 |
| 4.2 | 6.0 | 7.9 | 10.2 | 12.6 | 16.4 | 12.0 | 11.6 | 9.5 | 8.9 | 5.4 | 4.1 | 4.7 | 6.8 | 9.1 | 10.7 | 12.2 | 15.2 | 16.0 | 12.6 | 10.6 | 10.0 | 7.3 | 4.5 | 2.4 | 8.0 | 9.1 | 11.8 | 15.7 | 8.7 | 7.0 | 8.7 | 9.1 | 9.2 | 8.4 | 5.8 |
| 19.8 | 18.9 | 18.2 | 17.7 | 16.7 | 18.3 | 16.7 | 16.9 | 17.3 | 16.5 | 17.3 | 17.1 | 11.4 | 12.6 | 12.5 | 14.2 | 18.8 | 19.9 | 22.8 | 20.5 | 22.2 | 16.9 | 7.6 | 6.5 | 10.4 | 16.6 | 19.9 | 22.0 | 18.4 | 18.2 | 15.4 | 16.5 | 19.9 | 19.3 | 20.3 | 20.4 |
| 16.4 | 13.9 | 12.3 | 8.5 | 6.0 | 5.5 | 5.6 | 6.6 | 7.6 | 7.0 | 20.6 | 23.7 | 22.6 | 22.4 | 21.2 | 21.0 | 16.2 | 18.5 | 20.7 | 22.7 | 24.4 | 19.3 | 13.0 | 15.3 | 16.9 | 17.7 | 21.0 | 19.5 | 21.5 | 21.4 | 17.6 | 20.9 | 22.2 | 22.7 | 23.2 | 21.6 |
| 19.5 | 20.5 | 18.9 | 15.8 | 13.6 | 8.8 | 4.1 | 4.5 | 4.1 | 4.9 | 16.0 | 24.1 | 24.0 | 20.7 | 14.9 | 10.7 | 5.0 | 3.7 | 7.4 | 18.3 | 22.0 | 21.7 | 19.8 | 16.8 | 15.9 | 20.1 | 17.8 | 11.9 | 9.6 | 9.6 | 12.8 | 17.2 | 14.1 | 15.8 | 12.7 | 16.6 |
| 15.3 | 18.7 | 18.3 | 19.1 | 21.5 | 13.5 | 10.5 | 7.2 | 5.4 | 5.0 | 6.0 | 18.6 | 21.2 | 19.0 | 19.2 | 15.0 | 8.1 | 5.8 | 5.1 | 11.0 | 13.3 | 13.0 | 14.3 | 10.3 | 10.8 | 13.1 | 11.8 | 8.9 | 9.6 | 15.8 | 16.7 | 11.6 | 12.1 | 10.9 | 8.6 | 17.5 |
| 14.9 | 14.1 | 13.9 | 15.7 | 17.6 | 17.8 | 16.3 | 15.7 | 13.1 | 11.1 | 9.9 | 18.9 | 17.9 | 15.3 | 17.6 | 16.4 | 16.3 | 13.9 | 10.1 | 10.9 | 15.7 | 16.6 | 13.9 | 13.7 | 12.6 | 10.7 | 9.8 | 8.6 | 7.8 | 12.2 | 13.8 | 12.5 | 12.8 | 13.4 | 12.3 | 16.2 |
| 12.0 | 12.5 | 12.2 | 12.5 | 10.2 | 12.5 | 14.8 | 16.0 | 15.6 | 13.5 | 14.5 | 17.6 | 14.3 | 14.7 | 14.6 | 13.8 | 13.0 | 12.7 | 12.0 | 11.7 | 13.3 | 13.3 | 13.9 | 14.2 | 13.3 | 12.5 | 11.3 | 11.5 | 11.6 | 11.5 | 11.5 | 10.0 | 11.5 | 11.4 | 13.0 | 9.9 |
| 10.3 | 11.0 | 11.1 | 10.9 | 11.1 | 11.3 | 10.8 | 11.1 | 11.7 | 12.5 | 13.4 | 13.6 | 13.0 | 10.9 | 11.2 | 10.9 | 10.9 | 10.5 | 10.0 | 10.2 | 10.5 | 10.7 | 10.8 | 10.8 | 11.3 | 11.7 | 11.3 | 10.9 | 10.4 | 10.6 | 11.0 | 11.2 | 11.2 | 11.4 | 12.2 | 11.3 |
| 9.8 | 9.2 | 9.1 | 9.2 | 8.7 | 9.3 | 9.4 | 9.3 | 8.7 | 9.2 | 9.4 | 10.8 | 10.9 | 9.4 | 8.1 | 7.7 | 7.8 | 8.9 | 8.5 | 8.8 | 8.4 | 9.0 | 10.0 | 10.4 | 10.0 | 9.0 | 9.4 | 9.3 | 9.4 | 10.0 | 10.2 | 10.5 | 10.1 | 9.3 | 9.4 | 9.2 |
| 6.9 | 6.9 | 7.6 | 8.6 | 8.9 | 9.3 | 8.9 | 9.1 | 9.6 | 9.6 | 10.4 | 9.2 | 7.9 | 7.0 | 7.0 | 8.9 | 8.8 | 6.7 | 6.3 | 5.8 | 6.1 | 4.8 | 3.7 | 3.8 | 4.9 | 5.0 | 3.7 | 3.8 | 3.1 | 3.6 | 3.8 | 3.0 | 3.3 | 5.1 | 8.7 | 7.5 |
| 7.1 | 6.9 | 7.4 | 7.2 | 6.8 | 7.2 | 6.9 | 6.5 | 5.6 | 3.9 | 5.6 | 6.9 | 7.0 | 6.6 | 6.4 | 5.8 | 5.1 | 4.2 | 4.2 | 3.9 | 3.4 | 3.2 | 3.4 | 3.7 | 4.1 | 4.1 | 4.0 | 3.8 | 3.3 | 3.3 | 3.0 | 2.8 | 3.5 | 5.0 | 7.5 | 7.1 |

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations

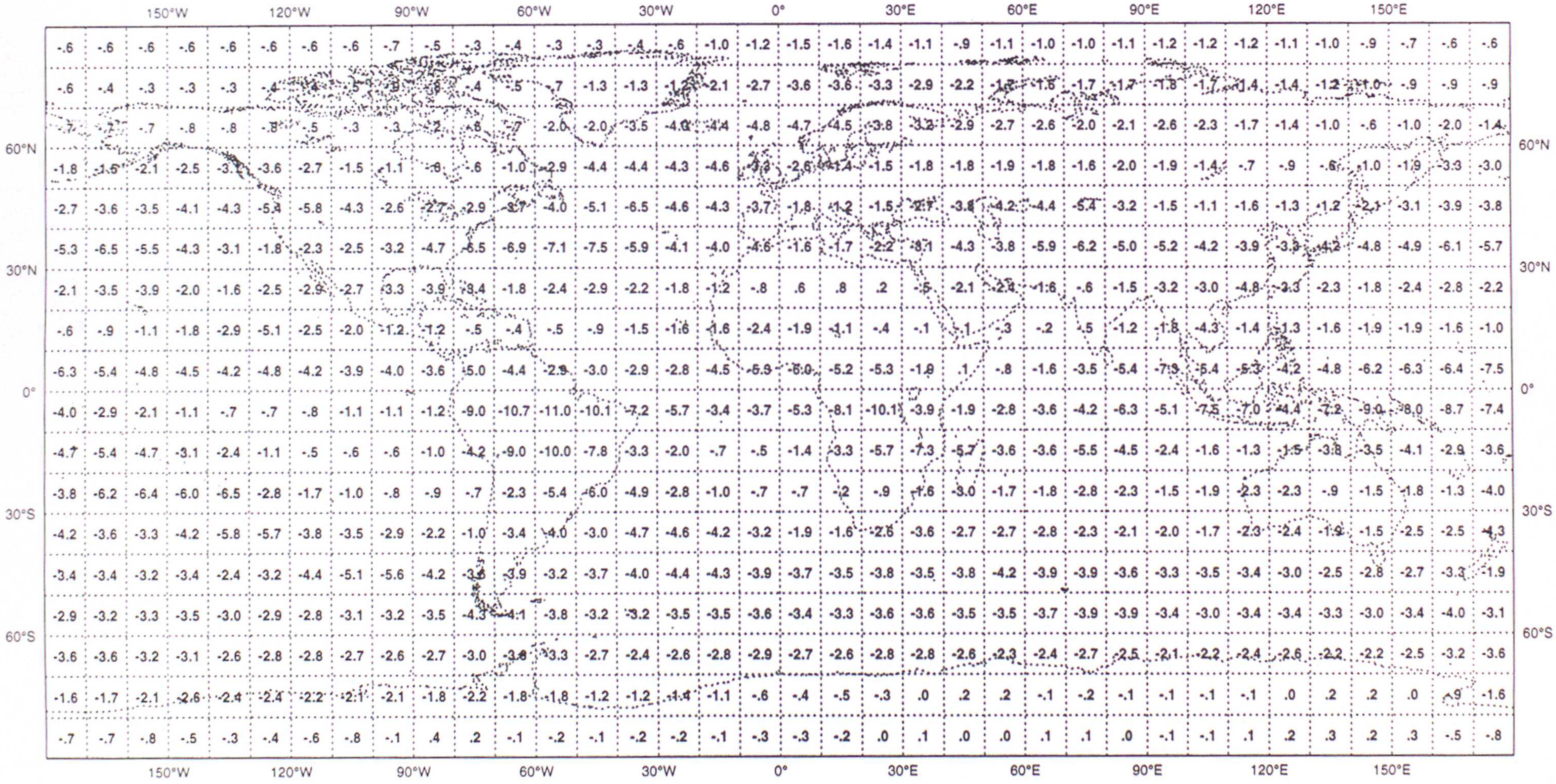

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.5 -.3 -.4 -.3 -.3 -.4 -.6 -1.0 -1.2 -1.5 -1.6 -1.4 -1.1 -.9 -1.1 -1.0 -1.0 -1.1 -1.2 -1.2 -1.2 -1.1 -1.0 -.9 -.7 -.6 -.6
-.6 -.4 -.3 -.3 -.3 -.4 -.4 -.5 -.9 -.8 -.4 -.5 -.7 -1.3 -1.3 -1.2 -2.1 -2.7 -3.6 -3.6 -3.3 -2.9 -2.2 -1.7 -1.6 -1.7 -1.7 -1.8 -1.7 -1.4 -1.4 -1.2 -1.0 -.9 -.9 -.9
-.7 -.7 -.7 -.8 -.8 -.8 -.5 -.3 -.3 -.2 -.6 -.7 -2.0 -2.0 -3.5 -4.0 -4.4 -4.8 -4.7 -4.5 -3.8 -3.2 -2.9 -2.7 -2.6 -2.0 -2.1 -2.6 -2.3 -1.7 -1.4 -1.0 -.6 -1.0 -2.0 -1.4
-1.8 -1.6 -2.1 -2.5 -3.2 -3.6 -2.7 -1.5 -1.1 -.8 -.6 -1.0 -2.9 -4.4 -4.4 -4.3 -4.6 -3.3 -2.6 -1.4 -1.5 -1.8 -1.8 -1.9 -1.8 -1.6 -2.0 -1.9 -1.4 -.7 -.9 -.6 -1.0 -1.9 -3.3 -3.0
-2.7 -3.6 -3.5 -4.1 -4.3 -5.4 -5.8 -4.3 -2.6 -2.7 -2.9 -3.7 -4.0 -5.1 -6.5 -4.6 -4.3 -3.7 -1.8 -1.2 -1.5 -2.7 -3.8 -4.2 -4.4 -5.4 -3.2 -1.5 -1.1 -1.6 -1.3 -1.2 -2.1 -3.1 -3.9 -3.8
-5.3 -6.5 -5.5 -4.3 -3.1 -1.8 -2.3 -2.5 -3.2 -4.7 -6.5 -6.9 -7.1 -7.5 -5.9 -4.1 -4.0 -4.6 -1.6 -1.7 -2.2 -8.1 -4.3 -3.8 -5.9 -6.2 -5.0 -5.2 -4.2 -3.9 -3.3 -4.2 -4.8 -4.9 -6.1 -5.7
-2.1 -3.5 -3.9 -2.0 -1.6 -2.5 -2.9 -2.7 -3.3 -3.9 -3.4 -1.8 -2.4 -2.9 -2.2 -1.8 -1.2 -.8 .6 .8 .2 -.5 -2.1 -2.4 -1.6 -.6 -1.5 -3.2 -3.0 -4.8 -3.3 -2.3 -1.8 -2.4 -2.8 -2.2
-.6 -.9 -1.1 -1.8 -2.9 -5.1 -2.5 -2.0 -1.2 -1.2 -.5 -.4 -.5 -.9 -1.5 -1.6 -1.6 -2.4 -1.9 -1.1 -.4 -.1 -.1 -.3 -.2 -.5 -1.2 -1.8 -4.3 -1.4 -1.3 -1.6 -1.9 -1.9 -1.6 -1.0
-6.3 -5.4 -4.8 -4.5 -4.2 -4.8 -4.2 -3.9 -4.0 -3.6 -5.0 -4.4 -2.9 -3.0 -2.9 -2.8 -4.5 -5.9 -6.0 -5.2 -5.3 -1.9 .1 -.8 -1.6 -3.5 -5.4 -7.3 -5.4 -5.3 -4.2 -4.8 -6.2 -6.3 -6.4 -7.5
-4.0 -2.9 -2.1 -1.1 -.7 -.7 -.8 -1.1 -1.1 -1.2 -9.0 -10.7 -11.0 -10.1 -7.2 -5.7 -3.4 -3.7 -5.3 -8.1 -10.1 -3.9 -1.9 -2.8 -3.6 -4.2 -6.3 -5.1 -7.5 -7.0 -4.4 -7.2 -9.0 -8.0 -8.7 -7.4
-4.7 -5.4 -4.7 -3.1 -2.4 -1.1 -.5 -.6 -.6 -1.0 -4.2 -9.0 -10.0 -7.8 -3.3 -2.0 -.7 -.5 -1.4 -3.3 -5.7 -7.3 -5.7 -3.6 -3.6 -5.5 -4.5 -2.4 -1.6 -1.3 -1.5 -3.8 -3.5 -4.1 -2.9 -3.6
-3.8 -6.2 -6.4 -6.0 -6.5 -2.8 -1.7 -1.0 -.8 -.9 -.7 -2.3 -5.4 -6.0 -4.9 -2.8 -1.0 -.7 -.7 -.2 -.9 -1.6 -3.0 -1.7 -1.8 -2.8 -2.3 -1.5 -1.9 -2.3 -2.3 -.9 -1.5 -1.8 -1.3 -4.0
-4.2 -3.6 -3.3 -4.2 -5.8 -5.7 -3.8 -3.5 -2.9 -2.2 -1.0 -3.4 -4.0 -3.0 -4.7 -4.6 -4.2 -3.2 -1.9 -1.6 -2.6 -3.6 -2.7 -2.7 -2.8 -2.3 -2.1 -2.0 -1.7 -2.3 -2.4 -1.9 -1.5 -2.5 -2.5 -4.3
-3.4 -3.4 -3.2 -3.4 -2.4 -3.2 -4.4 -5.1 -5.6 -4.2 -3.6 -3.9 -3.2 -3.7 -4.0 -4.4 -4.3 -3.9 -3.7 -3.5 -3.8 -3.5 -3.8 -4.2 -3.9 -3.9 -3.6 -3.3 -3.5 -3.4 -3.0 -2.5 -2.8 -2.7 -3.3 -1.9
-2.9 -3.2 -3.3 -3.5 -3.0 -2.9 -2.8 -3.1 -3.2 -3.5 -4.3 -4.1 -3.8 -3.2 -3.2 -3.5 -3.5 -3.6 -3.4 -3.3 -3.6 -3.6 -3.5 -3.5 -3.7 -3.9 -3.9 -3.4 -3.0 -3.4 -3.4 -3.3 -3.0 -3.4 -4.0 -3.1
-3.6 -3.6 -3.2 -3.1 -2.6 -2.8 -2.8 -2.7 -2.6 -2.7 -3.0 -3.6 -3.3 -2.7 -2.4 -2.6 -2.8 -2.9 -2.7 -2.6 -2.8 -2.8 -2.6 -2.3 -2.4 -2.7 -2.5 -2.1 -2.2 -2.4 -2.6 -2.2 -2.2 -2.5 -3.2 -3.6
-1.6 -1.7 -2.1 -2.6 -2.4 -2.4 -2.2 -2.1 -2.1 -1.8 -2.2 -1.8 -1.8 -1.2 -1.2 -1.4 -1.1 -.6 -.4 -.5 -.3 .0 .2 .2 -.1 -.2 -.1 -.1 -.1 -.1 .0 .2 .2 .0 -.9 -1.6
-.7 -.7 -.8 -.5 -.3 -.4 -.6 -.8 -.1 .4 .2 -.1 -.2 -.1 -.2 -.2 -.1 -.3 -.3 -.2 .0 .1 .0 .0 .1 .1 .0 -.1 -.1 .1 .2 .3 .2 .3 -.5 -.8

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations

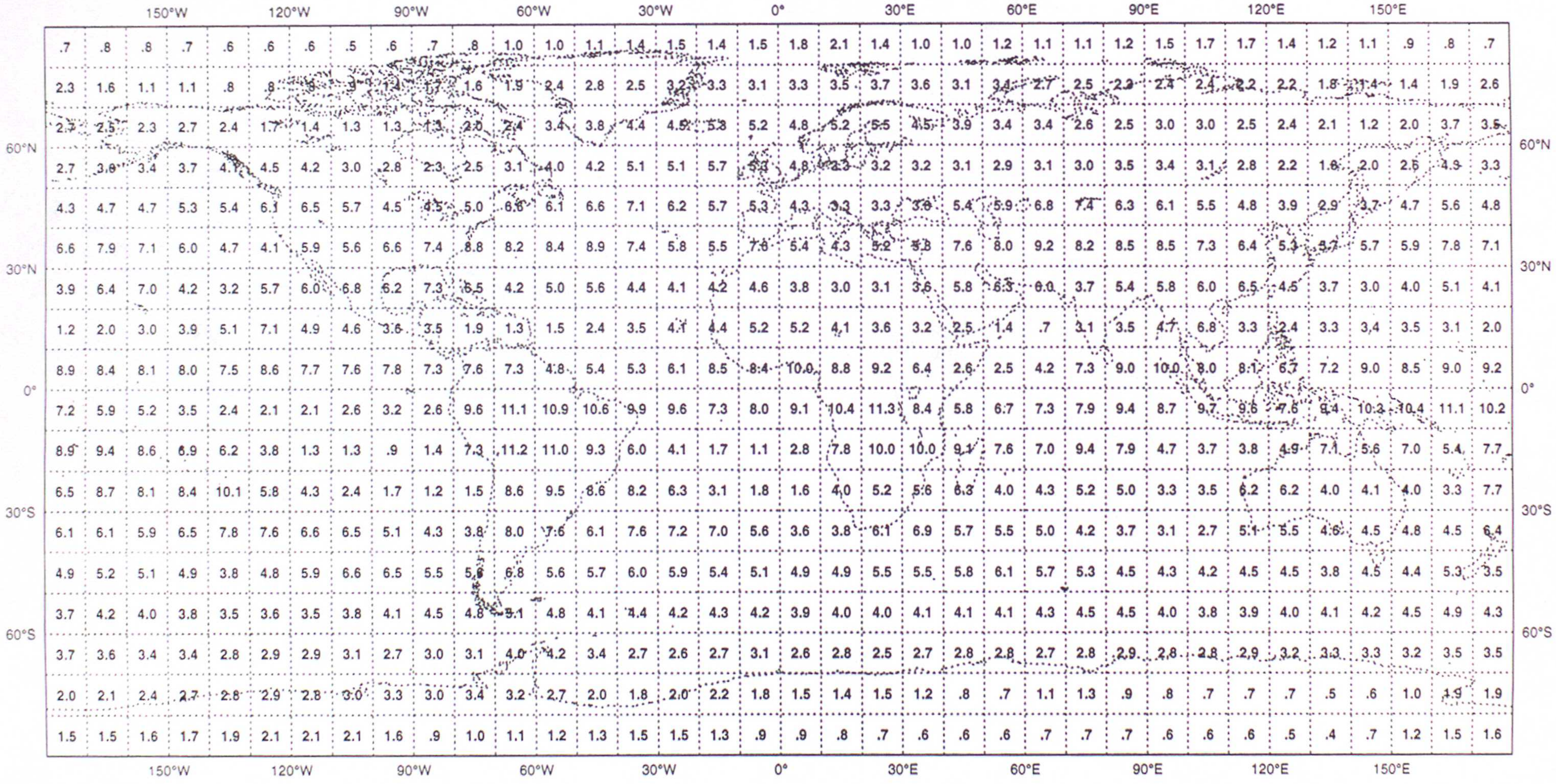

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.7 .8 .8 .7 .6 .6 .6 .5 .6 .7 .8 1.0 1.0 1.1 1.4 1.5 1.4 1.5 1.8 2.1 1.4 1.0 1.0 1.2 1.1 1.1 1.2 1.5 1.7 1.7 1.4 1.2 1.1 .9 .8 .7
2.3 1.6 1.1 1.1 .8 .8 .9 .9 1.4 1.7 1.6 1.9 2.4 2.8 2.5 3.2 3.3 3.1 3.3 3.5 3.7 3.6 3.1 3.4 2.7 2.5 2.3 2.4 2.4 2.2 2.2 1.8 1.4 1.4 1.9 2.6
2.7 2.5 2.3 2.7 2.4 1.7 1.4 1.3 1.3 1.3 2.0 2.4 3.4 3.8 4.4 4.5 5.8 5.2 4.8 5.2 5.5 4.5 3.9 3.4 3.4 2.6 2.5 3.0 3.0 2.5 2.4 2.1 1.2 2.0 3.7 3.5
2.7 3.6 3.4 3.7 4.1 4.5 4.2 3.0 2.8 2.3 2.5 3.1 4.0 4.2 5.1 5.1 5.7 5.3 4.8 2.3 3.2 3.2 3.1 2.9 3.1 3.0 3.5 3.4 3.1 2.8 2.2 1.6 2.0 2.6 4.9 3.3
4.3 4.7 4.7 5.3 5.4 6.1 6.5 5.7 4.5 4.5 5.0 6.6 6.1 6.6 7.1 6.2 5.7 5.3 4.3 3.3 3.3 3.6 5.4 5.9 6.8 7.4 6.3 6.1 5.5 4.8 3.9 2.9 3.7 4.7 5.6 4.8
6.6 7.9 7.1 6.0 4.7 4.1 5.9 5.6 6.6 7.4 8.8 8.2 8.4 8.9 7.4 5.8 5.5 7.8 5.4 4.3 5.2 5.3 7.6 8.0 9.2 8.2 8.5 8.5 7.3 6.4 5.3 5.7 5.7 5.9 7.8 7.1
3.9 6.4 7.0 4.2 3.2 5.7 6.0 6.8 6.2 7.3 6.5 4.2 5.0 5.6 4.4 4.1 4.2 4.6 3.8 3.0 3.1 3.6 5.8 6.3 6.0 3.7 5.4 5.8 6.0 6.5 4.5 3.7 3.0 4.0 5.1 4.1
1.2 2.0 3.0 3.9 5.1 7.1 4.9 4.6 3.6 3.5 1.9 1.3 1.5 2.4 3.5 4.1 4.4 5.2 5.2 4.1 3.6 3.2 2.5 1.4 .7 3.1 3.5 4.7 6.8 3.3 2.4 3.3 3.4 3.5 3.1 2.0
8.9 8.4 8.1 8.0 7.5 8.6 7.7 7.6 7.8 7.3 7.6 7.3 4.8 5.4 5.3 6.1 8.5 8.4 10.0 8.8 9.2 6.4 2.6 2.5 4.2 7.3 9.0 10.0 8.0 8.1 6.7 7.2 9.0 8.5 9.0 9.2
7.2 5.9 5.2 3.5 2.4 2.1 2.1 2.6 3.2 2.6 9.6 11.1 10.9 10.6 9.9 9.6 7.3 8.0 9.1 10.4 11.3 8.4 5.8 6.7 7.3 7.9 9.4 8.7 9.7 9.6 7.6 9.4 10.3 10.4 11.1 10.2
8.9 9.4 8.6 6.9 6.2 3.8 1.3 1.3 .9 1.4 7.3 11.2 11.0 9.3 6.0 4.1 1.7 1.1 2.8 7.8 10.0 10.0 9.1 7.6 7.0 9.4 7.9 4.7 3.7 3.8 4.9 7.1 5.6 7.0 5.4 7.7
6.5 8.7 8.1 8.4 10.1 5.8 4.3 2.4 1.7 1.2 1.5 8.6 9.5 8.6 8.2 6.3 3.1 1.8 1.6 4.0 5.2 5.6 6.3 4.0 4.3 5.2 5.0 3.3 3.5 6.2 6.2 4.0 4.1 4.0 3.3 7.7
6.1 6.1 5.9 6.5 7.8 7.6 6.6 6.5 5.1 4.3 3.8 8.0 7.6 6.1 7.6 7.2 7.0 5.6 3.6 3.8 6.1 6.9 5.7 5.5 5.0 4.2 3.7 3.1 2.7 5.1 5.5 4.6 4.5 4.8 4.5 6.4
4.9 5.2 5.1 4.9 3.8 4.8 5.9 6.6 6.5 5.5 5.6 6.8 5.6 5.7 6.0 5.9 5.4 5.1 4.9 4.9 5.5 5.5 5.8 6.1 5.7 5.3 4.5 4.3 4.2 4.5 4.5 3.8 4.5 4.4 5.3 3.5
3.7 4.2 4.0 3.8 3.5 3.6 3.5 3.8 4.1 4.5 4.8 5.1 4.8 4.1 4.4 4.2 4.3 4.2 3.9 4.0 4.0 4.1 4.1 4.1 4.3 4.5 4.5 4.0 3.8 3.9 4.0 4.1 4.2 4.5 4.9 4.3
3.7 3.6 3.4 3.4 2.8 2.9 2.9 3.1 2.7 3.0 3.1 4.0 4.2 3.4 2.7 2.6 2.7 3.1 2.6 2.8 2.5 2.7 2.8 2.8 2.7 2.8 2.9 2.8 2.8 2.9 3.2 3.3 3.3 3.2 3.5 3.5
2.0 2.1 2.4 2.7 2.8 2.9 2.8 3.0 3.3 3.0 3.4 3.2 2.7 2.0 1.8 2.0 2.2 1.8 1.5 1.4 1.5 1.2 .8 .7 1.1 1.3 .9 .8 .7 .7 .7 .5 .6 1.0 1.9 1.9
1.5 1.5 1.6 1.7 1.9 2.1 2.1 2.1 1.6 .9 1.0 1.1 1.2 1.3 1.5 1.5 1.3 .9 .9 .8 .7 .6 .6 .6 .7 .7 .7 .6 .6 .6 .5 .4 .7 1.2 1.5 1.6

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations

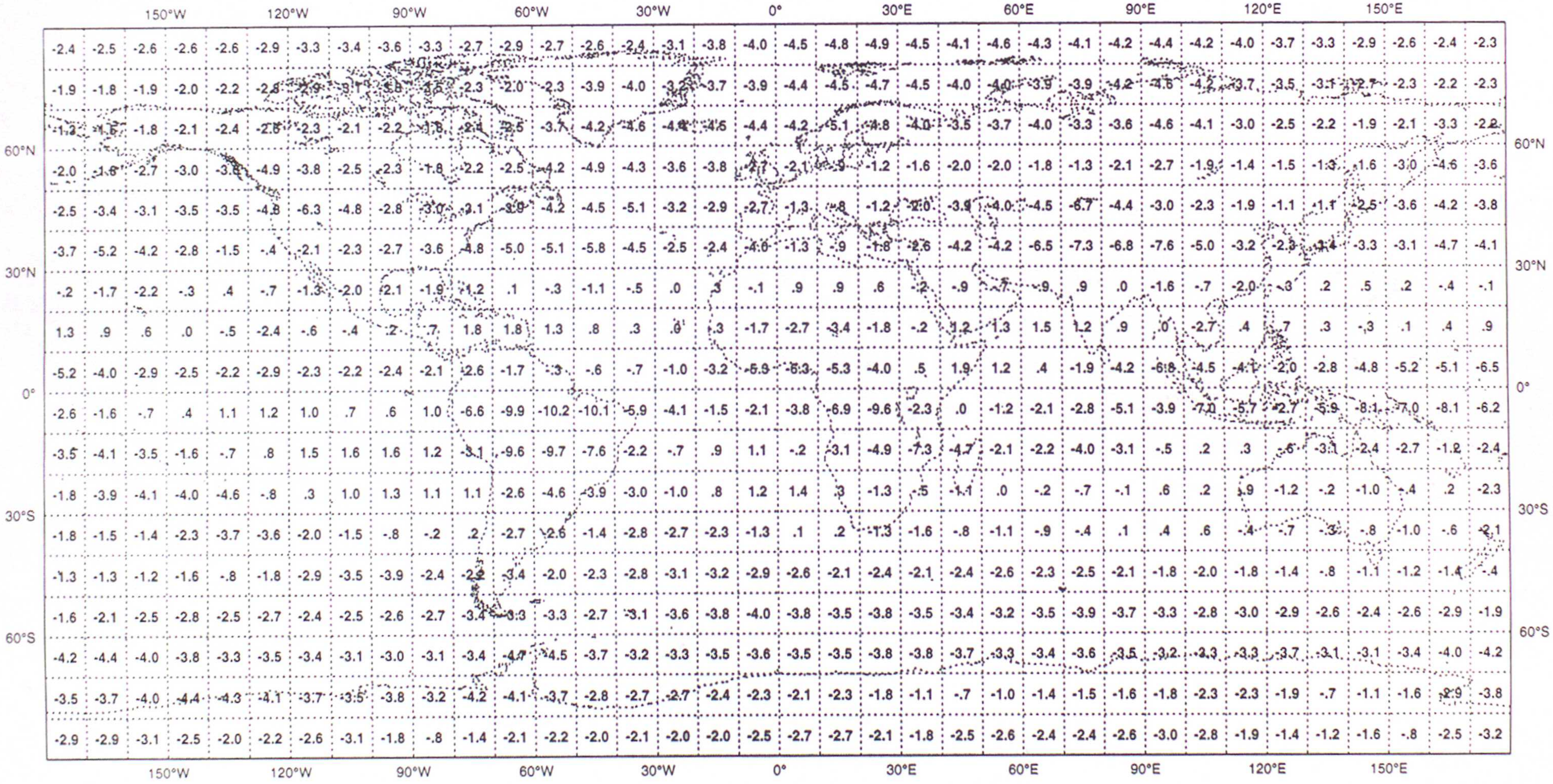

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-2.4 -2.5 -2.6 -2.6 -2.6 -2.9 -3.3 -3.4 -3.6 -3.3 -2.7 -2.9 -2.7 -2.6 -2.4 -3.1 -3.8 -4.0 -4.5 -4.8 -4.9 -4.5 -4.1 -4.6 -4.3 -4.1 -4.2 -4.4 -4.2 -4.0 -3.7 -3.3 -2.9 -2.6 -2.4 -2.3
-1.9 -1.8 -1.9 -2.0 -2.2 -2.8 -2.9 -3.1 -3.8 -3.6 -2.3 -2.0 -2.3 -3.9 -4.0 -3.2 -3.7 -3.9 -4.4 -4.5 -4.7 -4.5 -4.0 -4.0 -3.9 -3.9 -4.2 -4.6 -4.2 -3.7 -3.5 -3.1 -2.7 -2.3 -2.2 -2.3
-1.3 -1.5 -1.8 -2.1 -2.4 -2.6 -2.3 -2.1 -2.2 -1.8 -2.4 -2.5 -3.7 -4.2 -4.6 -4.8 -4.5 -4.4 -4.2 -5.1 -4.8 -4.0 -3.5 -3.7 -4.0 -3.3 -3.6 -4.6 -4.1 -3.0 -2.5 -2.2 -1.9 -2.1 -3.3 -2.2
-2.0 -1.6 -2.7 -3.0 -3.8 -4.9 -3.8 -2.5 -2.3 -1.8 -2.2 -2.5 -4.2 -4.9 -4.3 -3.6 -3.8 -4.7 -2.1 -.9 -1.2 -1.6 -2.0 -2.0 -1.8 -1.3 -2.1 -2.7 -1.9 -1.4 -1.5 -1.3 -1.6 -3.0 -4.6 -3.6
-2.5 -3.4 -3.1 -3.5 -3.5 -4.8 -6.3 -4.8 -2.8 -3.0 -3.1 -3.9 -4.2 -4.5 -5.1 -3.2 -2.9 -2.7 -1.3 -.8 -1.2 -2.0 -3.9 -4.0 -4.5 -6.7 -4.4 -3.0 -2.3 -1.9 -1.1 -1.1 -2.5 -3.6 -4.2 -3.8
-3.7 -5.2 -4.2 -2.8 -1.5 -.4 -2.1 -2.3 -2.7 -3.6 -4.8 -5.0 -5.1 -5.8 -4.5 -2.5 -2.4 -4.6 -1.3 -.9 -1.8 -2.6 -4.2 -4.2 -6.5 -7.3 -6.8 -7.6 -5.0 -3.2 -2.3 -1.4 -3.3 -3.1 -4.7 -4.1
-.2 -1.7 -2.2 -.3 .4 -.7 -1.3 -2.0 2.1 -1.9 -1.2 .1 -.3 -1.1 -.5 .0 .3 -.1 .9 .9 .6 -.2 -.9 -.7 -.9 .9 .0 -1.6 -.7 -2.0 -.3 .2 .5 .2 -.4 -.1
1.3 .9 .6 .0 -.5 -2.4 -.6 -.4 .2 .7 1.8 1.8 1.3 .8 .3 .6 .3 -1.7 -2.7 -3.4 -1.8 -.2 1.2 1.3 1.5 1.2 .9 .0 -2.7 .4 .7 .3 -.3 .1 .4 .9
-5.2 -4.0 -2.9 -2.5 -2.2 -2.9 -2.3 -2.2 -2.4 -2.1 -2.6 -1.7 -.3 -.6 -.7 -1.0 -3.2 -5.9 -6.3 -5.3 -4.0 .5 1.9 1.2 .4 -1.9 -4.2 -6.8 -4.5 -4.1 -2.0 -2.8 -4.8 -5.2 -5.1 -6.5
-2.6 -1.6 -.7 .4 1.1 1.2 1.0 .7 .6 1.0 -6.6 -9.9 -10.2 -10.1 -5.9 -4.1 -1.5 -2.1 -3.8 -6.9 -9.6 -2.3 .0 -1.2 -2.1 -2.8 -5.1 -3.9 -7.0 -5.7 -2.7 -5.9 -8.1 -7.0 -8.1 -6.2
-3.5 -4.1 -3.5 -1.6 -.7 .8 1.5 1.6 1.6 1.2 -3.1 -9.6 -9.7 -7.6 -2.2 -.7 .9 1.1 -.2 -3.1 -4.9 -7.3 -4.7 -2.1 -2.2 -4.0 -3.1 -.5 .2 .3 -.6 -3.1 -2.4 -2.7 -1.2 -2.4
-1.8 -3.9 -4.1 -4.0 -4.6 -.8 .3 1.0 1.3 1.1 1.1 -2.6 -4.6 -3.9 -3.0 -1.0 .8 1.2 1.4 .3 -1.3 -.5 -1.1 .0 -.2 -.7 -.1 .6 .2 .9 -1.2 -.2 -1.0 -.4 .2 -2.3
-1.8 -1.5 -1.4 -2.3 -3.7 -3.6 -2.0 -1.5 -.8 -.2 .2 -2.7 -2.6 -1.4 -2.8 -2.7 -2.3 -1.3 .1 .2 -1.3 -1.6 -.8 -1.1 -.9 -.4 .1 .4 .6 -.4 -.7 -.3 -.8 -1.0 -.6 -2.1
-1.3 -1.3 -1.2 -1.6 -.8 -1.8 -2.9 -3.5 -3.9 -2.4 -2.2 -3.4 -2.0 -2.3 -2.8 -3.1 -3.2 -2.9 -2.6 -2.1 -2.4 -2.1 -2.4 -2.6 -2.3 -2.5 -2.1 -1.8 -2.0 -1.8 -1.4 -.8 -1.1 -1.2 -1.4 -.4
-1.6 -2.1 -2.5 -2.8 -2.5 -2.7 -2.4 -2.5 -2.6 -2.7 -3.4 -3.3 -3.3 -2.7 -3.1 -3.6 -3.8 -4.0 -3.8 -3.5 -3.8 -3.5 -3.4 -3.2 -3.5 -3.9 -3.7 -3.3 -2.8 -3.0 -2.9 -2.6 -2.4 -2.6 -2.9 -1.9
-4.2 -4.4 -4.0 -3.8 -3.3 -3.5 -3.4 -3.1 -3.0 -3.1 -3.4 -4.7 -4.5 -3.7 -3.2 -3.3 -3.5 -3.6 -3.5 -3.5 -3.8 -3.8 -3.7 -3.3 -3.4 -3.6 -3.5 -3.2 -2.3 -3.3 -3.7 -3.1 -3.1 -3.4 -4.0 -4.2
-3.5 -3.7 -4.0 -4.4 -4.3 -4.1 -3.7 -3.5 -3.8 -3.2 -4.2 -4.1 -3.7 -2.8 -2.7 -2.7 -2.4 -2.3 -2.1 -2.3 -1.8 -1.1 -.7 -1.0 -1.4 -1.5 -1.6 -1.8 -2.3 -2.3 -1.9 -.7 -1.1 -1.6 -2.9 -3.8
-2.9 -2.9 -3.1 -2.5 -2.0 -2.2 -2.6 -3.1 -1.8 -.8 -1.4 -2.1 -2.2 -2.0 -2.1 -2.0 -2.0 -2.5 -2.7 -2.7 -2.1 -1.8 -2.5 -2.6 -2.4 -2.4 -2.6 -3.0 -2.8 -1.9 -1.4 -1.2 -1.6 -.8 -2.5 -3.2

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations

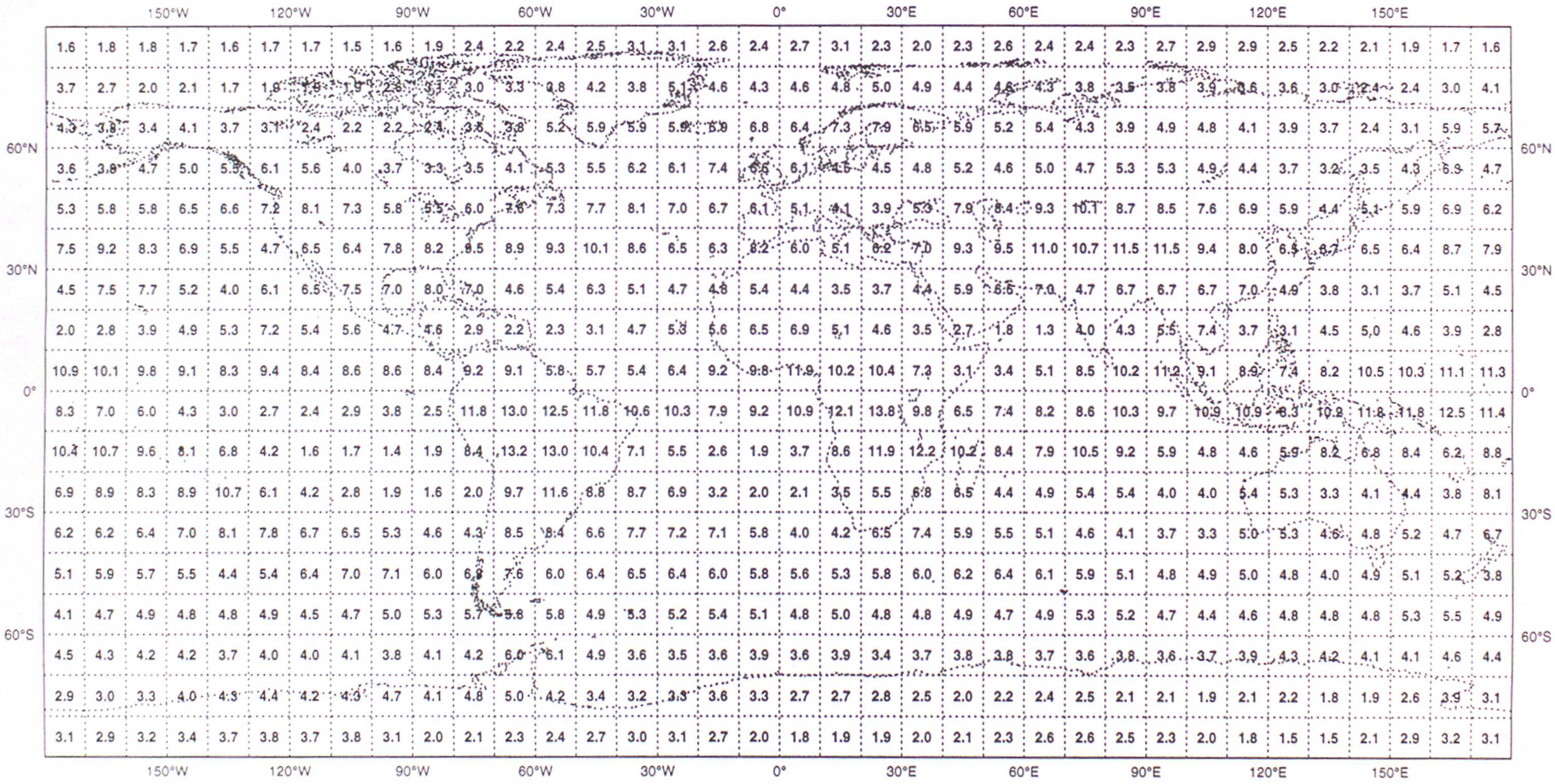
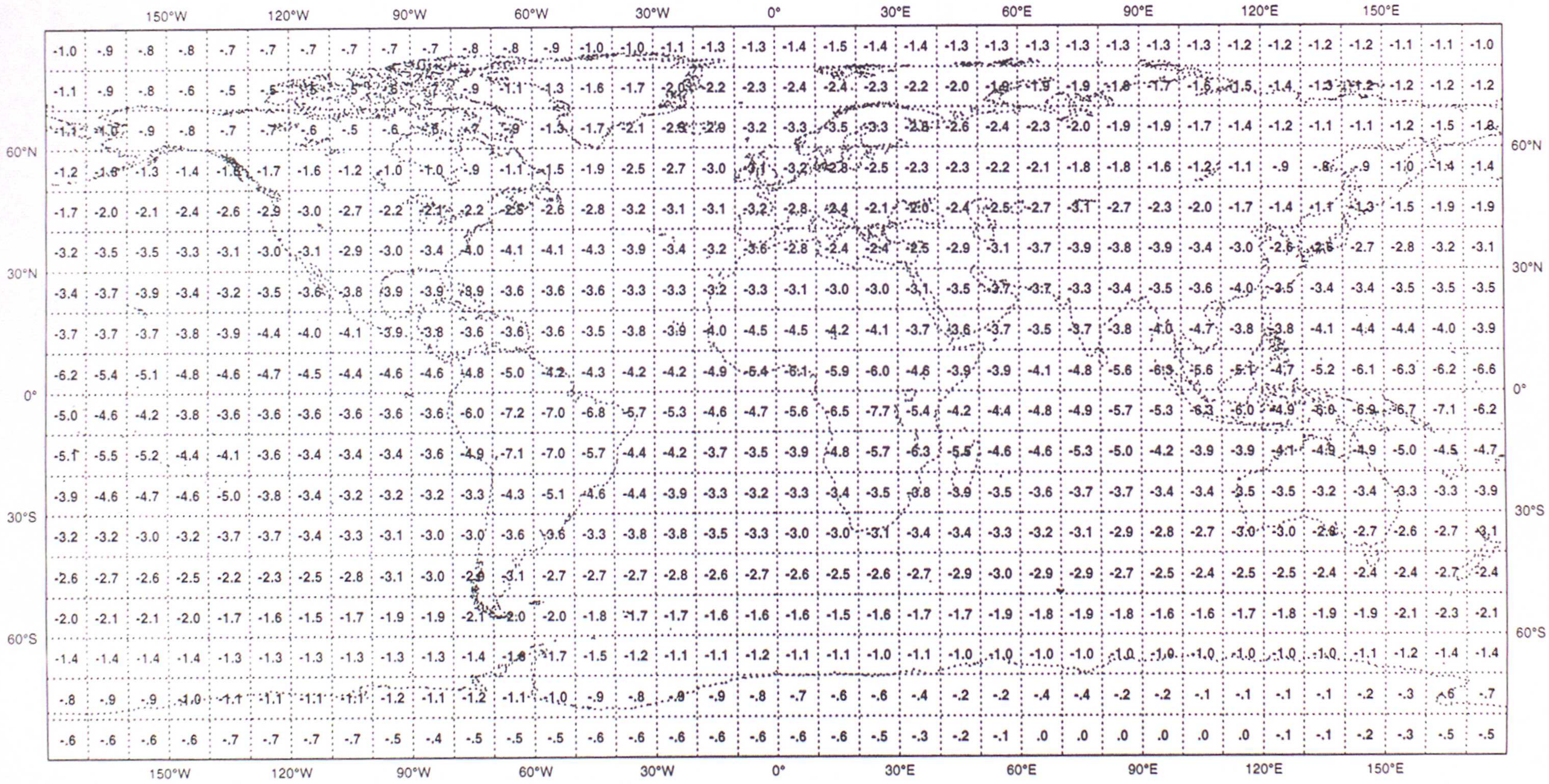
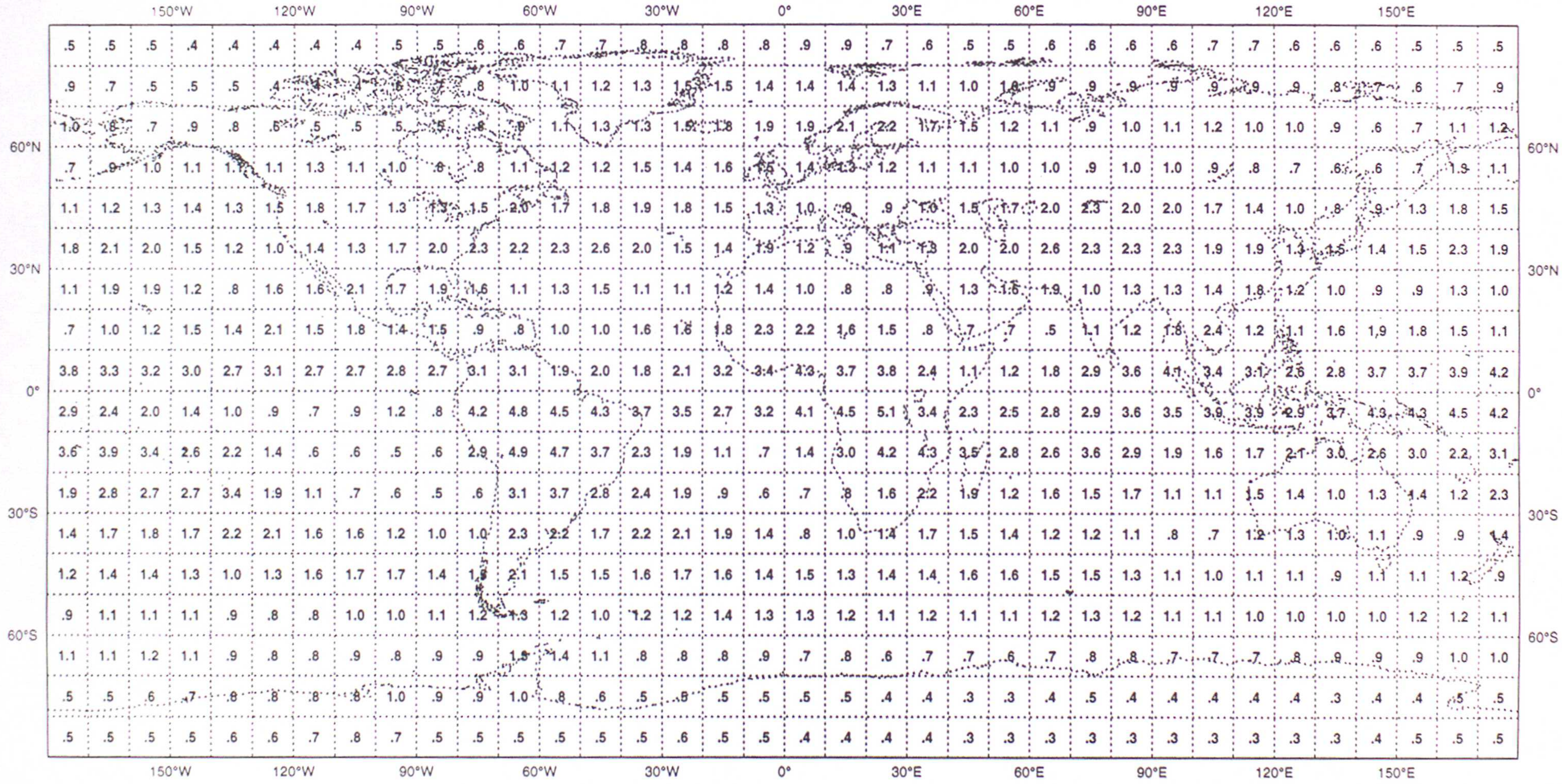

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.6 1.8 1.8 1.7 1.6 1.7 1.7 1.5 1.6 1.9 2.4 2.2 2.4 2.5 3.1 3.1 2.6 2.4 2.7 3.1 2.3 2.0 2.3 2.6 2.4 2.4 2.3 2.7 2.9 2.9 2.5 2.2 2.1 1.9 1.7 1.6
3.7 2.7 2.0 2.1 1.7 1.9 1.8 1.9 2.6 3.1 3.0 3.3 3.8 4.2 3.8 5.1 4.6 4.3 4.6 4.8 5.0 4.9 4.4 4.6 4.3 3.8 3.5 3.8 3.9 3.6 3.6 3.0 2.4 2.4 3.0 4.1
4.3 3.8 3.4 4.1 3.7 3.1 2.4 2.2 2.2 2.4 3.5 3.8 5.2 5.9 5.9 5.9 5.9 6.8 6.4 7.3 7.9 6.5 5.9 5.2 5.4 4.3 3.9 4.9 4.8 4.1 3.9 3.7 2.4 3.1 5.9 5.7
3.6 3.8 4.7 5.0 5.5 6.1 5.6 4.0 3.7 3.3 3.5 4.1 5.3 5.5 6.2 6.1 7.4 6.6 6.1 4.5 4.5 4.8 5.2 4.6 5.0 4.7 5.3 5.3 4.9 4.4 3.7 3.2 3.5 4.3 6.9 4.7
5.3 5.8 5.8 6.5 6.6 7.2 8.1 7.3 5.8 5.5 6.0 7.6 7.3 7.7 8.1 7.0 6.7 6.1 5.1 4.1 3.9 5.3 7.9 8.4 9.3 10.1 8.7 8.5 7.6 6.9 5.9 4.4 5.1 5.9 6.9 6.2
7.5 9.2 8.3 6.9 5.5 4.7 6.5 6.4 7.8 8.2 9.5 8.9 9.3 10.1 8.6 6.5 6.3 8.2 6.0 5.1 6.2 7.0 9.3 9.5 11.0 10.7 11.5 11.5 9.4 8.0 6.5 6.7 6.5 6.4 8.7 7.9
4.5 7.5 7.7 5.2 4.0 6.1 6.5 7.5 7.0 8.0 7.0 4.6 5.4 6.3 5.1 4.7 4.8 5.4 4.4 3.5 3.7 4.4 5.9 6.6 7.0 4.7 6.7 6.7 6.7 7.0 4.9 3.8 3.1 3.7 5.1 4.5
2.0 2.8 3.9 4.9 5.3 7.2 5.4 5.6 4.7 4.6 2.9 2.2 2.3 3.1 4.7 5.3 5.6 6.5 6.9 5.1 4.6 3.5 2.7 1.8 1.3 4.0 4.3 5.5 7.4 3.7 3.1 4.5 5.0 4.6 3.9 2.8
10.9 10.1 9.8 9.1 8.3 9.4 8.4 8.6 8.6 8.4 9.2 9.1 5.8 5.7 5.4 6.4 9.2 9.8 11.9 10.2 10.4 7.3 3.1 3.4 5.1 8.5 10.2 11.2 9.1 8.9 7.4 8.2 10.5 10.3 11.1 11.3
8.3 7.0 6.0 4.3 3.0 2.7 2.4 2.9 3.8 2.5 11.8 13.0 12.5 11.8 10.6 10.3 7.9 9.2 10.9 12.1 13.8 9.8 6.5 7.4 8.2 8.6 10.3 9.7 10.9 10.9 8.3 10.2 11.8 11.8 12.5 11.4
10.4 10.7 9.6 8.1 6.8 4.2 1.6 1.7 1.4 1.9 8.4 13.2 13.0 10.4 7.1 5.5 2.6 1.9 3.7 8.6 11.9 12.2 10.2 8.4 7.9 10.5 9.2 5.9 4.8 4.6 5.9 8.2 6.8 8.4 6.2 8.8
6.9 8.9 8.3 8.9 10.7 6.1 4.2 2.8 1.9 1.6 2.0 9.7 11.6 8.8 8.7 6.9 3.2 2.0 2.1 3.5 5.5 6.8 6.5 4.4 4.9 5.4 5.4 4.0 4.0 5.4 5.3 3.3 4.1 4.4 3.8 8.1
6.2 6.2 6.4 7.0 8.1 7.8 6.7 6.5 5.3 4.6 4.3 8.5 8.4 6.6 7.7 7.2 7.1 5.8 4.0 4.2 6.5 7.4 5.9 5.5 5.1 4.6 4.1 3.7 3.3 5.0 5.3 4.6 4.8 5.2 4.7 6.7
5.1 5.9 5.7 5.5 4.4 5.4 6.4 7.0 7.1 6.0 6.8 7.6 6.0 6.4 6.5 6.4 6.0 5.8 5.6 5.3 5.8 6.0 6.2 6.4 6.1 5.9 5.1 4.8 4.9 5.0 4.8 4.0 4.9 5.1 5.2 3.8
4.1 4.7 4.9 4.8 4.8 4.9 4.5 4.7 5.0 5.3 5.7 5.8 5.8 4.9 5.3 5.2 5.4 5.1 4.8 5.0 4.8 4.8 4.9 4.7 4.9 5.3 5.2 4.7 4.4 4.6 4.8 4.8 4.8 5.3 5.5 4.9
4.5 4.3 4.2 4.2 3.7 4.0 4.0 4.1 3.8 4.1 4.2 6.0 6.1 4.9 3.6 3.5 3.6 3.9 3.6 3.9 3.4 3.7 3.8 3.8 3.7 3.6 3.8 3.6 3.7 3.9 4.3 4.2 4.1 4.1 4.6 4.4
2.9 3.0 3.3 4.0 4.3 4.4 4.2 4.3 4.7 4.1 4.8 5.0 4.2 3.4 3.2 3.3 3.6 3.3 2.7 2.7 2.8 2.5 2.0 2.2 2.4 2.5 2.1 2.1 1.9 2.1 2.2 1.8 1.9 2.6 3.9 3.1
3.1 2.9 3.2 3.4 3.7 3.8 3.7 3.8 3.1 2.0 2.1 2.3 2.4 2.7 3.0 3.1 2.7 2.0 1.8 1.9 1.9 2.0 2.1 2.3 2.6 2.6 2.5 2.3 2.0 1.8 1.5 1.5 2.1 2.9 3.2 3.1

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -1.0 | -.9 | -.8 | -.8 | -.7 | -.7 | -.7 | -.7 | -.7 | -.7 | -.8 | -.8 | -.9 | -1.0 | -1.0 | -1.1 | -1.3 | -1.3 | -1.4 | -1.5 | -1.4 | -1.4 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.2 | -1.2 | -1.2 | -1.2 | -1.1 | -1.1 | -1.0 |
| -1.1 | -.9 | -.8 | -.6 | -.5 | -.5 | -.5 | -.5 | -.6 | -.7 | -.9 | -1.1 | -1.3 | -1.6 | -1.7 | -2.0 | -2.2 | -2.3 | -2.4 | -2.4 | -2.3 | -2.2 | -2.0 | -1.9 | -1.9 | -1.9 | -1.8 | -1.7 | -1.6 | -1.5 | -1.4 | -1.3 | -1.2 | -1.2 | -1.2 | -1.2 |
| -1.1 | -1.0 | -.9 | -.8 | -.7 | -.7 | -.6 | -.5 | -.6 | -.8 | -.7 | -.9 | -1.3 | -1.7 | -2.1 | -2.8 | -2.9 | -3.2 | -3.3 | -3.5 | -3.3 | -2.8 | -2.6 | -2.4 | -2.3 | -2.0 | -1.9 | -1.9 | -1.7 | -1.4 | -1.2 | -1.1 | -1.1 | -1.2 | -1.5 | -1.8 |
| -1.2 | -1.6 | -1.3 | -1.4 | -1.8 | -1.7 | -1.6 | -1.2 | -1.0 | -1.0 | -.9 | -1.1 | -1.5 | -1.9 | -2.5 | -2.7 | -3.0 | -3.1 | -3.2 | -2.8 | -2.5 | -2.3 | -2.3 | -2.2 | -2.1 | -1.8 | -1.8 | -1.6 | -1.2 | -1.1 | -.9 | -.8 | -.9 | -1.0 | -1.4 | -1.4 |
| -1.7 | -2.0 | -2.1 | -2.4 | -2.6 | -2.9 | -3.0 | -2.7 | -2.2 | -2.1 | -2.2 | -2.5 | -2.6 | -2.8 | -3.2 | -3.1 | -3.1 | -3.2 | -2.8 | -2.4 | -2.1 | -2.0 | -2.4 | -2.5 | -2.7 | -3.1 | -2.7 | -2.3 | -2.0 | -1.7 | -1.4 | -1.1 | -1.3 | -1.5 | -1.9 | -1.9 |
| -3.2 | -3.5 | -3.5 | -3.3 | -3.1 | -3.0 | -3.1 | -2.9 | -3.0 | -3.4 | -4.0 | -4.1 | -4.1 | -4.3 | -3.9 | -3.4 | -3.2 | -3.6 | -2.8 | -2.4 | -2.4 | -2.5 | -2.9 | -3.1 | -3.7 | -3.9 | -3.8 | -3.9 | -3.4 | -3.0 | -2.6 | -2.6 | -2.7 | -2.8 | -3.2 | -3.1 |
| -3.4 | -3.7 | -3.9 | -3.4 | -3.2 | -3.5 | -3.6 | -3.8 | -3.9 | -3.9 | -3.9 | -3.6 | -3.6 | -3.6 | -3.3 | -3.3 | -3.2 | -3.3 | -3.1 | -3.0 | -3.0 | -3.1 | -3.5 | -3.7 | -3.7 | -3.3 | -3.4 | -3.5 | -3.6 | -4.0 | -3.5 | -3.4 | -3.4 | -3.5 | -3.5 | -3.5 |
| -3.7 | -3.7 | -3.7 | -3.8 | -3.9 | -4.4 | -4.0 | -4.1 | -3.9 | -3.8 | -3.6 | -3.6 | -3.6 | -3.5 | -3.8 | -3.9 | -4.0 | -4.5 | -4.5 | -4.2 | -4.1 | -3.7 | -3.6 | -3.7 | -3.5 | -3.7 | -3.8 | -4.0 | -4.7 | -3.8 | -3.8 | -4.1 | -4.4 | -4.4 | -4.0 | -3.9 |
| -6.2 | -5.4 | -5.1 | -4.8 | -4.6 | -4.7 | -4.5 | -4.4 | -4.6 | -4.6 | -4.8 | -5.0 | -4.2 | -4.3 | -4.2 | -4.2 | -4.9 | -5.4 | -6.1 | -5.9 | -6.0 | -4.6 | -3.9 | -3.9 | -4.1 | -4.8 | -5.6 | -6.3 | -5.6 | -5.1 | -4.7 | -5.2 | -6.1 | -6.3 | -6.2 | -6.6 |
| -5.0 | -4.6 | -4.2 | -3.8 | -3.6 | -3.6 | -3.6 | -3.6 | -3.6 | -3.6 | -6.0 | -7.2 | -7.0 | -6.8 | -5.7 | -5.3 | -4.6 | -4.7 | -5.6 | -6.5 | -7.7 | -5.4 | -4.2 | -4.4 | -4.8 | -4.9 | -5.7 | -5.3 | -6.3 | -6.0 | -4.9 | -6.0 | -6.9 | -6.7 | -7.1 | -6.2 |
| -5.1 | -5.5 | -5.2 | -4.4 | -4.1 | -3.6 | -3.4 | -3.4 | -3.4 | -3.6 | -4.9 | -7.1 | -7.0 | -5.7 | -4.4 | -4.2 | -3.7 | -3.5 | -3.9 | -4.8 | -5.7 | -6.3 | -5.5 | -4.6 | -4.6 | -5.3 | -5.0 | -4.2 | -3.9 | -3.9 | -4.1 | -4.9 | -4.9 | -5.0 | -4.5 | -4.7 |
| -3.9 | -4.6 | -4.7 | -4.6 | -5.0 | -3.8 | -3.4 | -3.2 | -3.2 | -3.2 | -3.3 | -4.3 | -5.1 | -4.6 | -4.4 | -3.9 | -3.3 | -3.2 | -3.3 | -3.4 | -3.5 | -3.8 | -3.9 | -3.5 | -3.6 | -3.7 | -3.7 | -3.4 | -3.4 | -3.5 | -3.5 | -3.2 | -3.4 | -3.3 | -3.3 | -3.9 |
| -3.2 | -3.2 | -3.0 | -3.2 | -3.7 | -3.7 | -3.4 | -3.3 | -3.1 | -3.0 | -3.0 | -3.6 | -3.6 | -3.3 | -3.8 | -3.8 | -3.5 | -3.3 | -3.0 | -3.0 | -3.1 | -3.4 | -3.4 | -3.3 | -3.2 | -3.1 | -2.9 | -2.8 | -2.7 | -3.0 | -3.0 | -2.8 | -2.7 | -2.6 | -2.7 | -3.1 |
| -2.6 | -2.7 | -2.6 | -2.5 | -2.2 | -2.3 | -2.5 | -2.8 | -3.1 | -3.0 | -2.9 | -3.1 | -2.7 | -2.7 | -2.7 | -2.8 | -2.6 | -2.7 | -2.6 | -2.5 | -2.6 | -2.7 | -2.9 | -3.0 | -2.9 | -2.9 | -2.7 | -2.5 | -2.4 | -2.5 | -2.5 | -2.4 | -2.4 | -2.4 | -2.7 | -2.4 |
| -2.0 | -2.1 | -2.1 | -2.0 | -1.7 | -1.6 | -1.5 | -1.7 | -1.9 | -1.9 | -2.1 | -2.0 | -2.0 | -1.8 | -1.7 | -1.7 | -1.6 | -1.6 | -1.6 | -1.5 | -1.6 | -1.7 | -1.7 | -1.9 | -1.8 | -1.9 | -1.8 | -1.6 | -1.6 | -1.7 | -1.8 | -1.9 | -1.9 | -2.1 | -2.3 | -2.1 |
| -1.4 | -1.4 | -1.4 | -1.4 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.3 | -1.4 | -1.6 | -1.7 | -1.5 | -1.2 | -1.1 | -1.1 | -1.2 | -1.1 | -1.1 | -1.0 | -1.1 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.1 | -1.2 | -1.4 | -1.4 |
| -.8 | -.9 | -.9 | -1.0 | -1.1 | -1.1 | -1.1 | -1.1 | -1.2 | -1.1 | -1.2 | -1.1 | -1.0 | -.9 | -.8 | -.8 | -.9 | -.8 | -.7 | -.6 | -.6 | -.4 | -.2 | -.2 | -.4 | -.4 | -.2 | -.2 | -.1 | -.1 | -.1 | -.1 | -.2 | -.3 | -.6 | -.7 |
| -.6 | -.6 | -.6 | -.6 | -.7 | -.7 | -.7 | -.7 | -.5 | -.4 | -.5 | -.5 | -.5 | -.6 | -.6 | -.6 | -.6 | -.6 | -.6 | -.6 | -.5 | -.3 | -.2 | -.1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | -.1 | -.1 | -.2 | -.3 | -.5 | -.5 |

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .5 | .5 | .5 | .4 | .4 | .4 | .4 | .4 | .5 | .5 | .6 | .6 | .7 | .7 | .8 | .8 | .8 | .8 | .9 | .9 | .7 | .6 | .5 | .5 | .6 | .6 | .6 | .6 | .7 | .7 | .6 | .6 | .6 | .5 | .5 | .5 |
| .9 | .7 | .5 | .5 | .5 | .4 | .4 | .4 | .6 | .7 | .8 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.1 | 1.0 | 1.8 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .8 | .7 | .6 | .7 | .9 |
| 1.0 | .8 | .7 | .9 | .8 | .6 | .5 | .5 | .5 | .5 | .8 | .9 | 1.1 | 1.3 | 1.3 | 1.5 | 1.8 | 1.9 | 1.9 | 2.1 | 2.2 | 1.7 | 1.5 | 1.2 | 1.1 | .9 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | .9 | .6 | .7 | 1.1 | 1.2 |
| .7 | .9 | 1.0 | 1.1 | 1.1 | 1.1 | 1.3 | 1.1 | 1.0 | .8 | .8 | 1.1 | 1.2 | 1.2 | 1.5 | 1.4 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | .9 | 1.0 | 1.0 | .9 | .8 | .7 | .6 | .6 | .7 | 1.3 | 1.1 |
| 1.1 | 1.2 | 1.3 | 1.4 | 1.3 | 1.5 | 1.8 | 1.7 | 1.3 | 1.3 | 1.5 | 2.0 | 1.7 | 1.8 | 1.9 | 1.8 | 1.5 | 1.3 | 1.0 | .9 | .9 | 1.0 | 1.5 | 1.7 | 2.0 | 2.3 | 2.0 | 2.0 | 1.7 | 1.4 | 1.0 | .8 | .9 | 1.3 | 1.8 | 1.5 |
| 1.8 | 2.1 | 2.0 | 1.5 | 1.2 | 1.0 | 1.4 | 1.3 | 1.7 | 2.0 | 2.3 | 2.2 | 2.3 | 2.6 | 2.0 | 1.5 | 1.4 | 1.9 | 1.2 | .9 | 1.1 | 1.3 | 2.0 | 2.0 | 2.6 | 2.3 | 2.3 | 2.3 | 1.9 | 1.9 | 1.3 | 1.5 | 1.4 | 1.5 | 2.3 | 1.9 |
| 1.1 | 1.9 | 1.9 | 1.2 | .8 | 1.6 | 1.6 | 2.1 | 1.7 | 1.9 | 1.6 | 1.1 | 1.3 | 1.5 | 1.1 | 1.1 | 1.2 | 1.4 | 1.0 | .8 | .8 | .9 | 1.3 | 1.6 | 1.9 | 1.0 | 1.3 | 1.3 | 1.4 | 1.8 | 1.2 | 1.0 | .9 | .9 | 1.3 | 1.0 |
| .7 | 1.0 | 1.2 | 1.5 | 1.4 | 2.1 | 1.5 | 1.8 | 1.4 | 1.5 | .9 | .8 | 1.0 | 1.0 | 1.6 | 1.6 | 1.8 | 2.3 | 2.2 | 1.6 | 1.5 | .8 | .7 | .7 | .5 | 1.1 | 1.2 | 1.8 | 2.4 | 1.2 | 1.1 | 1.6 | 1.9 | 1.8 | 1.5 | 1.1 |
| 3.8 | 3.3 | 3.2 | 3.0 | 2.7 | 3.1 | 2.7 | 2.7 | 2.8 | 2.7 | 3.1 | 3.1 | 1.9 | 2.0 | 1.8 | 2.1 | 3.2 | 3.4 | 4.3 | 3.7 | 3.8 | 2.4 | 1.1 | 1.2 | 1.8 | 2.9 | 3.6 | 4.1 | 3.4 | 3.1 | 2.6 | 2.8 | 3.7 | 3.7 | 3.9 | 4.2 |
| 2.9 | 2.4 | 2.0 | 1.4 | 1.0 | .9 | .7 | .9 | 1.2 | .8 | 4.2 | 4.8 | 4.5 | 4.3 | 3.7 | 3.5 | 2.7 | 3.2 | 4.1 | 4.5 | 5.1 | 3.4 | 2.3 | 2.5 | 2.8 | 2.9 | 3.6 | 3.5 | 3.9 | 3.9 | 2.9 | 3.7 | 4.3 | 4.3 | 4.5 | 4.2 |
| 3.6 | 3.9 | 3.4 | 2.6 | 2.2 | 1.4 | .6 | .6 | .5 | .6 | 2.9 | 4.9 | 4.7 | 3.7 | 2.3 | 1.9 | 1.1 | .7 | 1.4 | 3.0 | 4.2 | 4.3 | 3.5 | 2.8 | 2.6 | 3.6 | 2.9 | 1.9 | 1.6 | 1.7 | 2.1 | 3.0 | 2.6 | 3.0 | 2.2 | 3.1 |
| 1.9 | 2.8 | 2.7 | 2.7 | 3.4 | 1.9 | 1.1 | .7 | .6 | .5 | .6 | 3.1 | 3.7 | 2.8 | 2.4 | 1.9 | .9 | .6 | .7 | .8 | 1.6 | 2.2 | 1.9 | 1.2 | 1.6 | 1.5 | 1.7 | 1.1 | 1.1 | 1.5 | 1.4 | 1.0 | 1.3 | 1.4 | 1.2 | 2.3 |
| 1.4 | 1.7 | 1.8 | 1.7 | 2.2 | 2.1 | 1.6 | 1.6 | 1.2 | 1.0 | 1.0 | 2.3 | 2.2 | 1.7 | 2.2 | 2.1 | 1.9 | 1.4 | .8 | 1.0 | 1.4 | 1.7 | 1.5 | 1.4 | 1.2 | 1.2 | 1.1 | .8 | .7 | 1.2 | 1.3 | 1.0 | 1.1 | .9 | .9 | 1.4 |
| 1.2 | 1.4 | 1.4 | 1.3 | 1.0 | 1.3 | 1.6 | 1.7 | 1.7 | 1.4 | 1.8 | 2.1 | 1.5 | 1.5 | 1.6 | 1.7 | 1.6 | 1.4 | 1.5 | 1.3 | 1.4 | 1.4 | 1.6 | 1.6 | 1.5 | 1.5 | 1.3 | 1.1 | 1.0 | 1.1 | 1.1 | .9 | 1.1 | 1.1 | 1.2 | .9 |
| .9 | 1.1 | 1.1 | 1.1 | .9 | .8 | .8 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.2 | 1.0 | 1.2 | 1.2 | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 | 1.2 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.2 | 1.2 | 1.1 |
| 1.1 | 1.1 | 1.2 | 1.1 | .9 | .8 | .8 | .9 | .8 | .9 | .9 | 1.5 | 1.4 | 1.1 | .8 | .8 | .8 | .9 | .7 | .8 | .6 | .7 | .7 | .6 | .7 | .8 | .8 | .7 | .7 | .7 | .8 | .9 | .9 | .9 | 1.0 | 1.0 |
| .5 | .5 | .6 | .7 | .8 | .8 | .8 | .8 | 1.0 | .9 | .9 | 1.0 | .8 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .4 | .4 | .3 | .3 | .4 | .5 | .4 | .4 | .4 | .4 | .4 | .3 | .4 | .4 | .5 | .5 |
| .5 | .5 | .5 | .5 | .6 | .6 | .7 | .8 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .6 | .5 | .5 | .4 | .4 | .4 | .4 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .4 | .5 | .5 | .5 |

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C).  MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

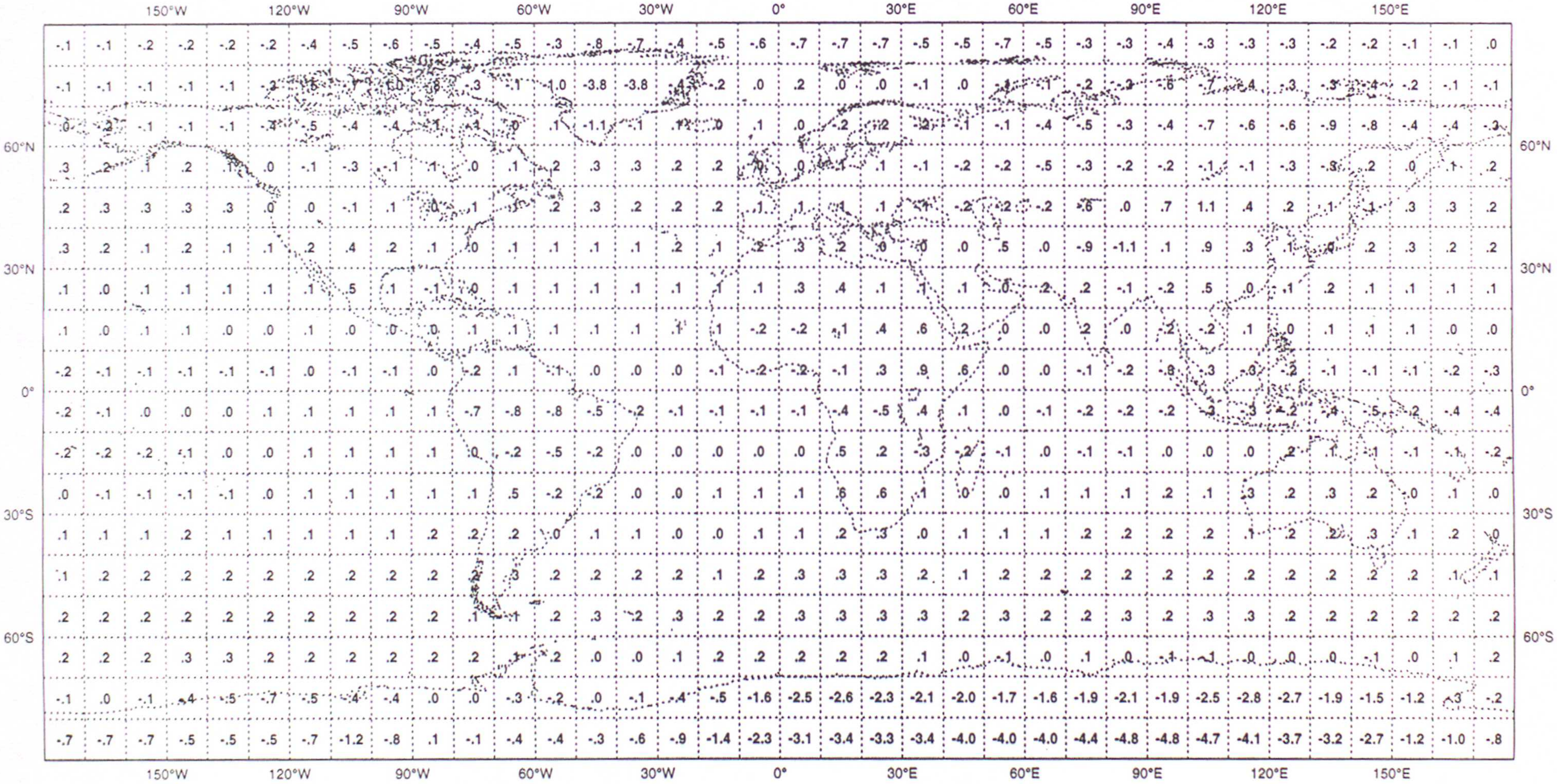
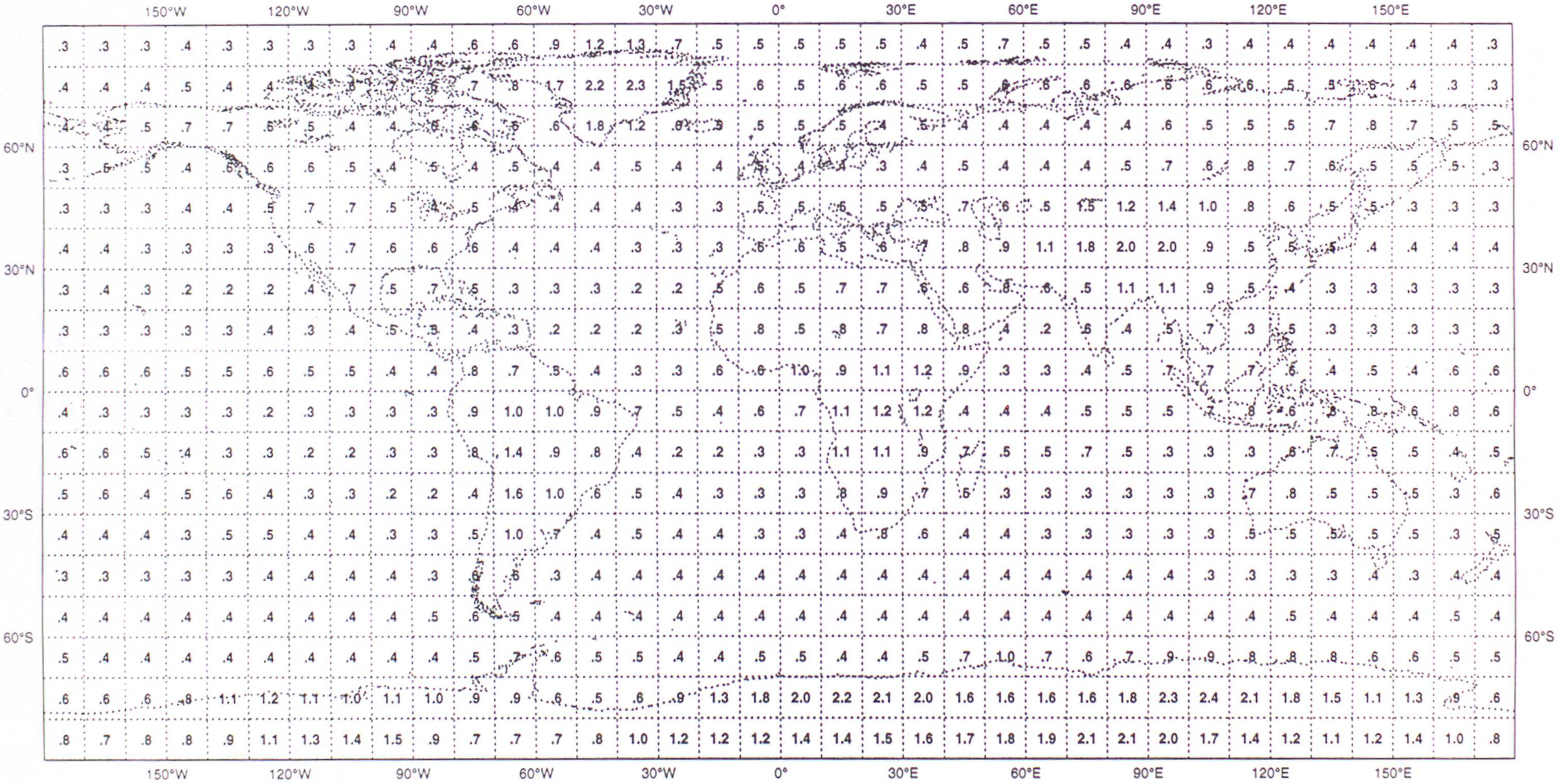

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-.1 -.1 -.2 -.2 -.2 -.2 -.4 -.5 -.6 -.5 -.4 -.5 -.3 -.8 -.7 -.4 -.5 -.6 -.7 -.7 -.7 -.5 -.5 -.7 -.5 -.3 -.3 -.4 -.3 -.3 -.3 -.2 -.2 -.1 -.1 .0
-.1 -.1 -.1 -.1 -.1 -.2 -.5 -.7 -1.0 -.8 -.3 -.1 -1.0 -3.8 -3.8 -.4 -.2 .0 .2 .0 .0 -.1 .0 -.1 -.1 -.2 -.2 -.6 -.7 -.4 -.3 -.3 -.4 -.2 -.1 -.1
.0 -.2 -.1 -.1 -.1 -.4 -.5 -.4 -.4 -.1 -.1 .0 .1 -1.1 -.1 .1 .0 .1 .0 -.2 .2 -.2 -.1 -.1 -.4 -.5 -.3 -.4 -.7 -.6 -.6 -.9 -.8 -.4 -.4 -.3
.3 .2 .1 .2 .1 .0 -.1 -.3 -.1 .1 .0 .1 .2 .3 .3 .2 .2 .0 .0 .1 .1 -.1 -.2 -.2 -.5 -.3 -.2 -.2 -.1 -.1 -.3 -.3 .2 .0 .1 .2
.2 .3 .3 .3 .3 .0 .0 -.1 .1 .0 .1 .1 .2 .3 .2 .2 .2 .1 .1 .1 .1 .1 -.2 .2 -.2 .6 .0 .7 1.1 .4 .2 .1 .1 .3 .3 .2
.3 .2 .1 .2 .1 .1 .2 .4 .2 .1 .0 .1 .1 .1 .1 .2 .1 .2 .3 .2 .0 .0 .0 .5 .0 -.9 -1.1 .1 .9 .3 .1 .0 .2 .3 .2 .2
.1 .0 .1 .1 .1 .1 .1 .5 .1 -.1 .0 .1 .1 .1 .1 .1 .1 .1 .3 .4 .1 .1 .1 .0 .2 .2 -.1 -.2 .5 .0 .1 .2 .1 .1 .1 .1
.1 .0 .1 .1 .0 .0 .1 .0 .0 .0 .1 .1 .1 .1 .1 .1 .1 -.2 -.2 .1 .4 .6 .2 .0 .0 .2 .0 .2 -.2 .1 .0 .1 .1 .1 .0 .0
-.2 -.1 -.1 -.1 -.1 -.1 .0 -.1 -.1 .0 -.2 .1 -.1 .0 .0 .0 -.1 -.2 -.2 -.1 .3 .9 .6 .0 .0 -.1 -.2 -.8 -.3 -.3 -.2 -.1 -.1 -.1 -.2 -.3
-.2 -.1 .0 .0 .0 .1 .1 .1 .1 .1 -.7 -.8 -.8 -.5 -.2 -.1 -.1 -.1 -.1 -.4 -.5 .4 .1 .0 -.1 -.2 -.2 -.2 -.3 -.3 -.2 -.4 -.5 -.2 -.4 -.4
-.2 -.2 -.2 .1 .0 .0 .1 .1 .1 .1 .0 -.2 -.5 -.2 .0 .0 .0 .0 .0 .5 .2 -.3 -.2 -.1 .0 -.1 -.1 .0 .0 .0 .2 .1 -.1 -.1 -.1 -.2
.0 -.1 -.1 -.1 -.1 .0 .1 .1 .1 .1 .1 .5 -.2 -.2 .0 .0 .1 .1 .1 .6 .6 .1 .0 .0 .1 .1 .1 .2 .1 .3 .2 .3 .2 .0 .1 .0
.1 .1 .1 .2 .1 .1 .1 .1 .1 .2 .2 .2 .0 .1 .1 .0 .0 .1 .1 .2 .3 .0 .1 .1 .1 .2 .2 .2 .2 .1 .2 .2 .3 .1 .2 .0
.1 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .2 .2 .2 .2 .1 .2 .3 .3 .3 .2 .1 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .1
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .2 .3 .2 .3 .2 .2 .3 .3 .3 .3 .2 .3 .2 .2 .3 .2 .3 .3 .2 .2 .2 .2 .2 .2
.2 .2 .2 .3 .3 .2 .2 .2 .2 .2 .2 .1 .2 .0 .0 .1 .2 .2 .2 .2 .2 .1 .0 -.1 .0 .1 .0 -.1 -.1 .0 .0 .0 -.1 .0 .1 .2
-.1 .0 -.1 -.4 -.5 -.7 -.5 -.4 -.4 .0 .0 -.3 -.2 .0 -.1 -.4 -.5 -1.6 -2.5 -2.6 -2.3 -2.1 -2.0 -1.7 -1.6 -1.9 -2.1 -1.9 -2.5 -2.8 -2.7 -1.9 -1.5 -1.2 -.3 -.2
-.7 -.7 -.7 -.5 -.5 -.5 -.7 -1.2 -.8 .1 -.1 -.4 -.4 -.3 -.6 -.9 -1.4 -2.3 -3.1 -3.4 -3.3 -3.4 -4.0 -4.0 -4.0 -4.4 -4.8 -4.8 -4.7 -4.1 -3.7 -3.2 -2.7 -1.2 -1.0 -.8

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .3 | .3 | .3 | .4 | .3 | .3 | .3 | .3 | .4 | .4 | .6 | .6 | .9 | 1.2 | 1.3 | .7 | .5 | .5 | .5 | .5 | .5 | .4 | .5 | .7 | .5 | .5 | .4 | .4 | .3 | .4 | .4 | .4 | .4 | .4 | .4 | .3 |
| .4 | .4 | .4 | .5 | .4 | .4 | .4 | .6 | .7 | .5 | .7 | .8 | 1.7 | 2.2 | 2.3 | 1.5 | .5 | .6 | .5 | .6 | .6 | .5 | .5 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .5 | .5 | .6 | .4 | .3 | .3 |
| .4 | .4 | .5 | .7 | .7 | .6 | .5 | .4 | .4 | .6 | .6 | .5 | .6 | 1.8 | 1.2 | .6 | .5 | .5 | .5 | .5 | .4 | .5 | .4 | .4 | .4 | .4 | .4 | .6 | .5 | .5 | .5 | .7 | .8 | .7 | .5 | .5 |
| .3 | .5 | .5 | .4 | .6 | .6 | .6 | .5 | .4 | .5 | .4 | .5 | .4 | .4 | .5 | .4 | .4 | .5 | .4 | .4 | .3 | .4 | .5 | .4 | .4 | .4 | .5 | .7 | .6 | .8 | .7 | .6 | .5 | .5 | .5 | .3 |
| .3 | .3 | .3 | .4 | .4 | .5 | .7 | .7 | .5 | .4 | .5 | .4 | .4 | .4 | .4 | .3 | .3 | .5 | .5 | .6 | .5 | .5 | .7 | .6 | .5 | 1.5 | 1.2 | 1.4 | 1.0 | .8 | .6 | .5 | .5 | .3 | .3 | .3 |
| .4 | .4 | .3 | .3 | .3 | .3 | .6 | .7 | .6 | .6 | .6 | .4 | .4 | .4 | .3 | .3 | .3 | .6 | .6 | .5 | .6 | .7 | .8 | .9 | 1.1 | 1.8 | 2.0 | 2.0 | .9 | .5 | .5 | .5 | .4 | .4 | .4 | .4 |
| .3 | .4 | .3 | .2 | .2 | .2 | .4 | .7 | .5 | .7 | .5 | .3 | .3 | .3 | .2 | .2 | .5 | .6 | .5 | .7 | .7 | .6 | .6 | .8 | .6 | .5 | 1.1 | 1.1 | .9 | .5 | .4 | .3 | .3 | .3 | .3 | .3 |
| .3 | .3 | .3 | .3 | .3 | .4 | .3 | .4 | .5 | .3 | .4 | .3 | .2 | .2 | .2 | .3 | .5 | .8 | .5 | .8 | .7 | .8 | .8 | .4 | .2 | .6 | .4 | .5 | .7 | .3 | .5 | .3 | .3 | .3 | .3 | .3 |
| .6 | .6 | .6 | .5 | .5 | .6 | .5 | .5 | .4 | .4 | .8 | .7 | .5 | .4 | .3 | .3 | .6 | .6 | 1.0 | .9 | 1.1 | 1.2 | .9 | .3 | .3 | .4 | .5 | .7 | .7 | .7 | .6 | .4 | .5 | .4 | .6 | .6 |
| .4 | .3 | .3 | .3 | .3 | .2 | .3 | .3 | .3 | .3 | .9 | 1.0 | 1.0 | .9 | .7 | .5 | .4 | .6 | .7 | 1.1 | 1.2 | 1.2 | .4 | .4 | .4 | .5 | .5 | .5 | .7 | .8 | .6 | .8 | .8 | .6 | .8 | .6 |
| .6 | .6 | .5 | .4 | .3 | .3 | .2 | .2 | .3 | .3 | .8 | 1.4 | .9 | .8 | .4 | .2 | .2 | .3 | .3 | 1.1 | 1.1 | .9 | .7 | .5 | .5 | .7 | .5 | .3 | .3 | .3 | .6 | .7 | .5 | .5 | .4 | .5 |
| .5 | .6 | .4 | .5 | .6 | .4 | .3 | .3 | .2 | .2 | .4 | 1.6 | 1.0 | .6 | .5 | .4 | .3 | .3 | .3 | .8 | .9 | .7 | .5 | .3 | .3 | .3 | .3 | .3 | .3 | .7 | .8 | .5 | .5 | .5 | .3 | .6 |
| .4 | .4 | .4 | .3 | .5 | .5 | .4 | .4 | .3 | .3 | .5 | 1.0 | .7 | .4 | .5 | .4 | .4 | .3 | .3 | .4 | .8 | .6 | .4 | .4 | .3 | .3 | .3 | .3 | .3 | .5 | .5 | .5 | .5 | .5 | .3 | .5 |
| .3 | .3 | .3 | .3 | .3 | .4 | .4 | .4 | .4 | .3 | .6 | .6 | .3 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .3 | .3 | .3 | .3 | .4 | .3 | .4 | .4 |
| .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .5 | .6 | .5 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .5 | .4 | .4 | .4 | .5 | .4 |
| .5 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .5 | .7 | .6 | .5 | .5 | .4 | .4 | .5 | .5 | .4 | .4 | .5 | .7 | 1.0 | .7 | .6 | .7 | .9 | .9 | .8 | .8 | .8 | .6 | .6 | .5 | .5 |
| .6 | .6 | .6 | .8 | 1.1 | 1.2 | 1.1 | 1.0 | 1.1 | 1.0 | .9 | .9 | .6 | .5 | .6 | .9 | 1.3 | 1.8 | 2.0 | 2.2 | 2.1 | 2.0 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 2.3 | 2.4 | 2.1 | 1.8 | 1.5 | 1.1 | 1.3 | .9 | .6 |
| .8 | .7 | .8 | .8 | .9 | 1.1 | 1.3 | 1.4 | 1.5 | .9 | .7 | .7 | .7 | .8 | 1.0 | 1.2 | 1.2 | 1.2 | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.1 | 2.1 | 2.0 | 1.7 | 1.4 | 1.2 | 1.1 | 1.2 | 1.4 | 1.0 | .8 |

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

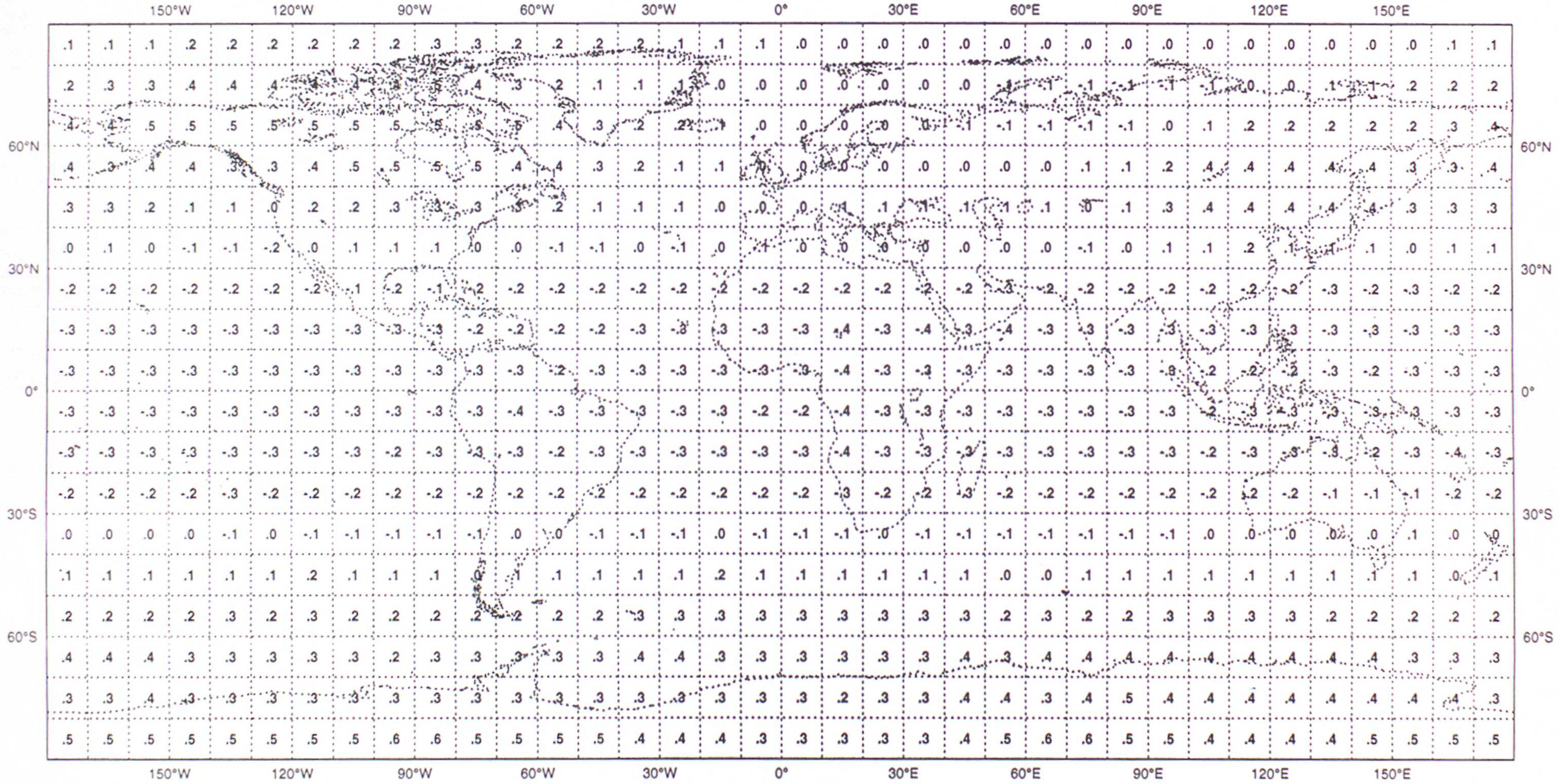

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.1 .1 .1 .2 .2 .2 .2 .2 .2 .3 .3 .2 .2 .2 .2 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1
.2 .3 .3 .4 .4 .4 .4 .4 .4 .5 .4 .3 .2 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 -.1 .0 .0 .1 .1 .2 .2 .2
.4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .3 .2 .2 .1 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 .0 .1 .2 .2 .2 .2 .2 .3 .4
.4 .3 .4 .4 .3 .3 .4 .5 .5 .5 .5 .4 .4 .3 .2 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .2 .4 .4 .4 .4 .4 .3 .3 .4
.3 .3 .2 .1 .1 .0 .2 .2 .3 .3 .3 .3 .2 .1 .1 .1 .0 .0 .0 .1 .1 .1 .1 .1 .1 .0 .1 .3 .4 .4 .4 .4 .4 .3 .3 .3
.0 .1 .0 -.1 -.1 -.2 .0 .1 .1 .1 .0 .0 -.1 -.1 .0 -.1 .0 .1 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .1 .1 .2 .1 .1 .1 .0 .1 .1
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.3 -.2 -.2
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.4 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.2 -.3 -.3 -.3
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.2 -.3 -.4 -.3
-.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.1 -.1 -.2 -.2
.0 .0 .0 .0 -.1 .0 -.1 -.1 -.1 -.1 -.1 .0 .0 -.1 -.1 -.1 .0 -.1 -.1 -.1 .0 -.1 -.1 -.1 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .0 .1 .0 .0
.1 .1 .1 .1 .1 .1 .2 .1 .1 .1 .0 .1 .1 .1 .1 .1 .2 .1 .1 .1 .1 .1 .1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .1 .1 .0 .1
.2 .2 .2 .2 .3 .2 .3 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .2 .2 .3 .3 .3 .3 .2 .2 .2 .2 .2
.4 .4 .4 .3 .3 .3 .3 .3 .2 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3
.3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .4 .4 .3 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .3
.5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .5 .5 .5 .4 .4 .4 .3 .3 .3 .3 .3 .4 .5 .6 .6 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

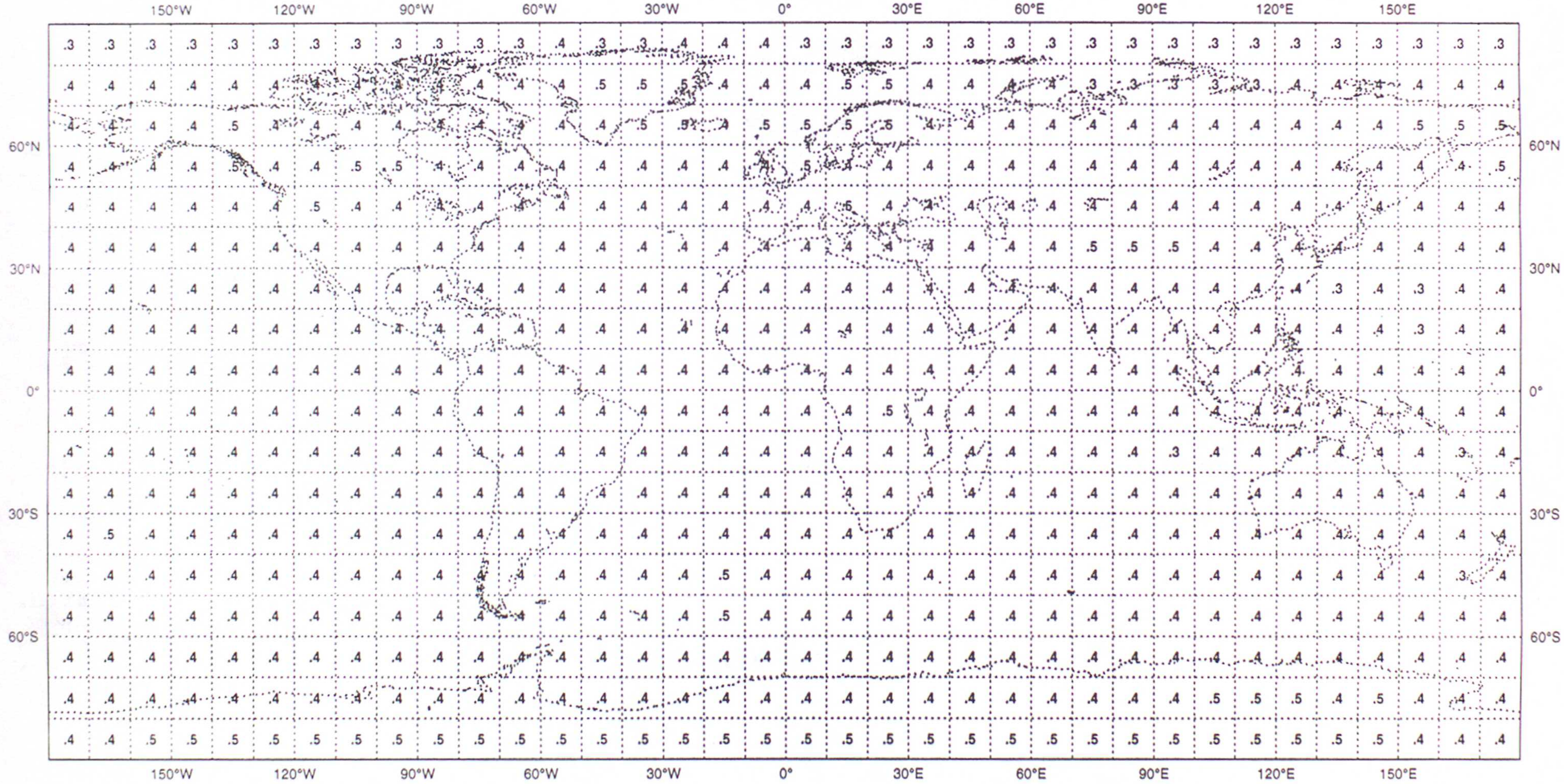
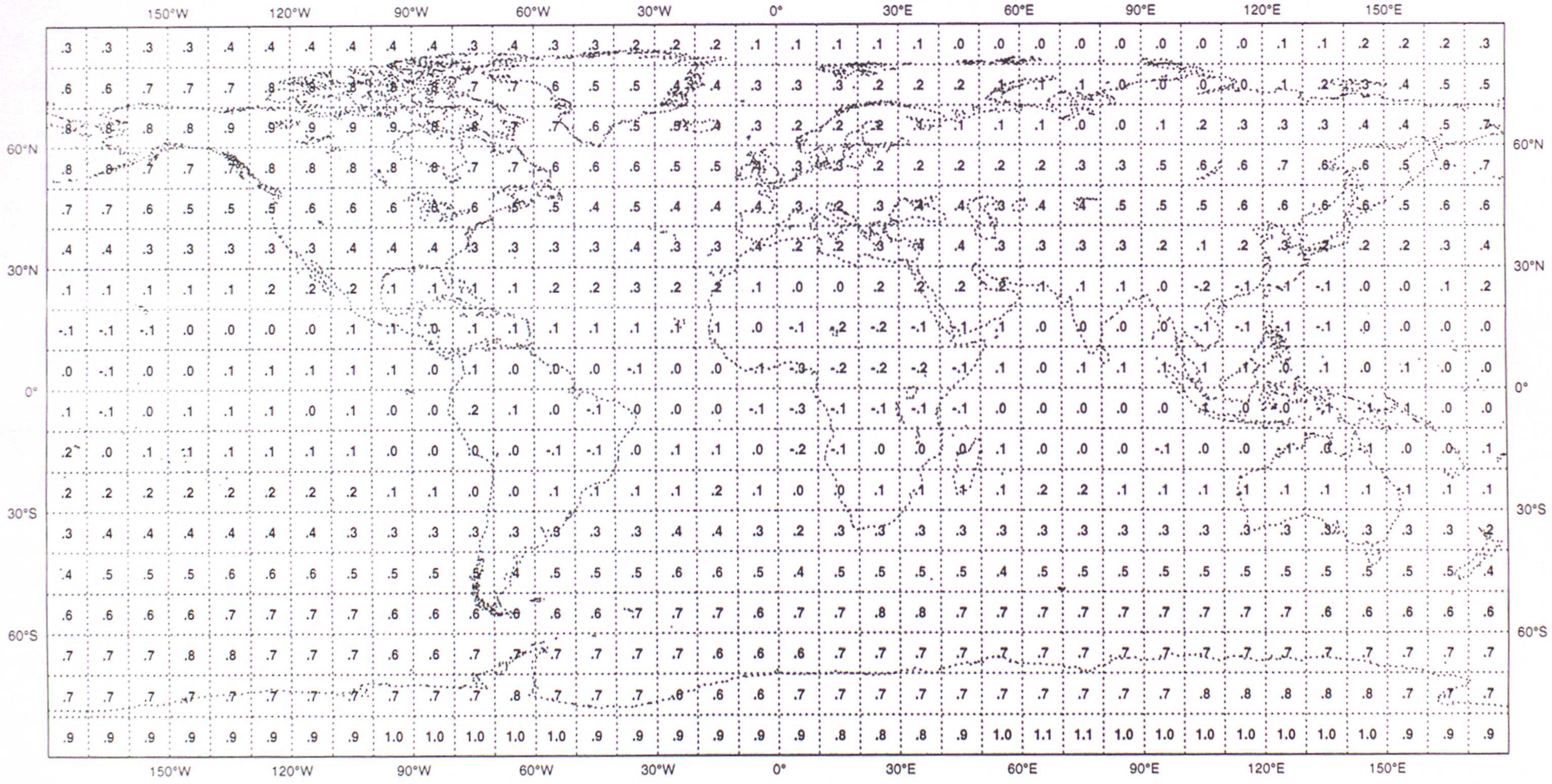

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5
.4 .4 .4 .4 .5 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5
.4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .6 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .5 .4 .4 .4
.4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3 .2 .2 .2 .1 .1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .2 .2 .2 .3
.6 .6 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .6 .5 .5 .4 .4 .3 .3 .3 .2 .2 .2 .1 .1 .1 .0 .0 .0 .0 .1 .2 .3 .4 .5 .5
.8 .8 .8 .8 .9 .9 .9 .9 .9 .8 .8 .7 .7 .6 .5 .5 .4 .3 .2 .2 .2 .1 .1 .1 .1 .0 .0 .1 .2 .3 .3 .3 .4 .4 .5 .7
.8 .8 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .6 .6 .6 .5 .5 .4 .3 .3 .2 .2 .2 .2 .2 .3 .3 .5 .6 .6 .7 .6 .6 .5 .8 .7
.7 .7 .6 .5 .5 .5 .6 .6 .6 .8 .6 .5 .5 .4 .5 .4 .4 .4 .3 .2 .3 .4 .4 .3 .4 .4 .5 .5 .5 .6 .6 .6 .6 .5 .6 .6
.4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .4 .3 .3 .4 .2 .2 .3 .4 .4 .3 .3 .3 .3 .2 .1 .2 .3 .2 .2 .2 .3 .4
.1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .3 .2 .2 .1 .0 .0 .2 .2 .2 .2 .1 .1 .1 .0 -.2 -.1 -.1 -.1 .0 .0 .1 .2
-.1 -.1 -.1 .0 .0 .0 .0 .1 .1 .0 .1 .1 .1 .1 .1 .1 .1 .0 -.1 -.2 -.2 -.1 -.1 .1 .0 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0
.0 -.1 .0 .0 .1 .1 .1 .1 .1 .0 .1 .0 .0 .0 -.1 .0 .0 -.1 -.3 -.2 -.2 -.2 -.1 .1 .0 .1 .1 .1 .1 .1 .0 .1 .0 .1 .0 .0
.1 -.1 .0 .1 .1 .1 .0 .1 .0 .0 .2 .1 .0 -.1 .0 .0 .0 -.1 -.3 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .0 .1 .0 .0 .1 -.1 .1 .0 .0
.2 .0 .1 .1 .1 .1 .1 .1 .0 .0 .0 .0 -.1 -.1 .0 .1 .1 .0 -.2 -.1 .0 .0 .0 .1 .0 .0 .0 -.1 .0 .0 -.1 .0 .1 .0 .0 .1
.2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .0 .0 .1 .1 .1 .1 .2 .1 .0 .0 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1
.3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.4 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .4 .5 .5 .5 .6 .6 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4
.6 .6 .6 .6 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .7 .7 .7 .6 .7 .7 .8 .8 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6
.7 .7 .7 .8 .8 .7 .7 .7 .6 .6 .7 .7 .7 .7 .7 .7 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .7 .7 .7 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .7
.9 .9 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .8 .8 .8 .9 1.0 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9

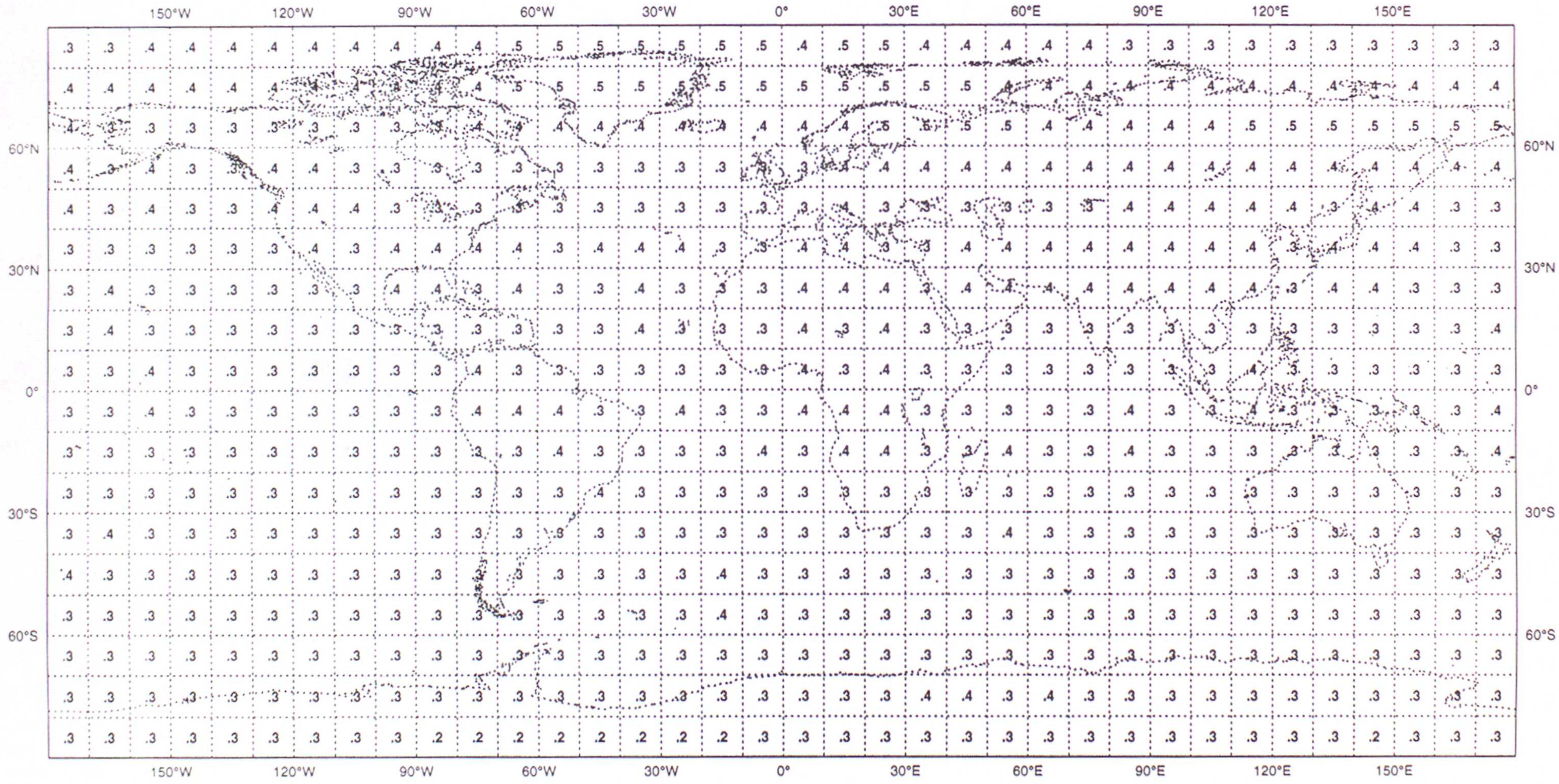

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

## TABLE 8

## MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
## DATA TYPE:- DRIFTER
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

| | | |
|---|---|---|
| **Monitoring procedures** | | |
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for drifting buoy. |
| **Area monitored** | | :10°N - 80°N, 85°W - 0°W |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :All hours combined. |
| **Elements monitored** | | :Mean sea-level pressure (hPa)<br>:Wind speed (m $s^{-1}$)<br>:Wind direction (degrees) |
| **Parameters monitored** | | |
| | :NOBS | :Number of observations received excluding duplicates. |
| | :NGE | :Number of observations with gross errors. |
| | :PGE | :Percentage of observations with gross errors. |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors.<br>**N.B. A positive bias indicates the wind observation is veered to the background** |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors |
| **GROSS ERROR LIMITS** | :15 hPa (pressure)<br>:25 m $s^{-1}$ (Vector Wind) | |

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 41503 | 13.9 | -66.8 | P | 558 | 0 | 2 | 0.6 | -1.2 | 1.3 |
| 41522 | 22.3 | -55.4 | P | 613 | 0 | 3 | 0.4 | -0.8 | 1.0 |
| 41531 | 23.1 | -67.1 | P | 642 | 0 | 4 | 0.5 | 0.3 | 0.6 |
| 41532 | 24.7 | -70.4 | P | 900 | 0 | 34 | 0.5 | 0.2 | 0.6 |
| 41534 | 26.7 | -62.6 | P | 636 | 0 | 2 | 0.5 | 0.2 | 0.5 |
| 41537 | 27.2 | -68.6 | P | 607 | 0 | 3 | 0.6 | 0.6 | 0.8 |
| 41640 | 39.5 | -29.2 | P | 498 | 0 | 100 | 0.7 | 2.3 | 2.4 |
| 41648 | 25.2 | -71.1 | P | 725 | 0 | 14 | 0.5 | -0.6 | 0.8 |
| 41649 | 16.3 | -61.1 | P | 483 | 0 | 3 | 0.5 | -2.3 | 2.4 |
| 41658 | 44.8 | -27.3 | P | 571 | 1 | 16 | 1.5 | -1.2 | 1.9 |
| 41659 | 30.5 | -30.1 | P | 658 | 0 | 2 | 0.6 | 0.3 | 0.6 |
| 41666 | 35.7 | -47.4 | P | 741 | 0 | 14 | 0.7 | 0.1 | 0.7 |
| 44585 | 42.1 | -69.1 | P | 273 | 0 | 17 | 1.7 | 1.0 | 2.0 |
| 44601 | 34.4 | -42.8 | P | 715 | 0 | 15 | 0.8 | -0.6 | 1.0 |
| 44603 | 57.1 | -34.3 | P | 698 | 0 | 1 | 1.2 | 0.0 | 1.2 |
| 44604 | 50.0 | -44.3 | P | 445 | 4 | 34 | 4.4 | 3.2 | 5.5 |
| 44606 | 28.8 | -51.9 | P | 713 | 0 | 0 | 0.6 | 0.2 | 0.6 |
| 44608 | 35.5 | -32.8 | P | 700 | 0 | 1 | 0.9 | 0.4 | 1.0 |
| 44609 | 50.6 | -24.4 | P | 673 | 0 | 0 | 0.9 | -0.6 | 1.1 |
| 44610 | 41.8 | -38.4 | P | 1063 | 0 | 35 | 1.7 | 0.3 | 1.7 |
| 44611 | 55.6 | -24.9 | P | 1349 | 0 | 46 | 1.1 | -0.1 | 1.1 |
| 44613 | 51.9 | -33.4 | P | 677 | 0 | 2 | 1.5 | -0.1 | 1.6 |
| 44614 | 61.8 | -31.9 | P | 1246 | 0 | 46 | 1.5 | 0.6 | 1.6 |
| 44615 | 43.3 | -47.8 | P | 478 | 0 | 1 | 1.0 | -0.2 | 1.1 |
| 44616 | 36.1 | -10.7 | P | 696 | 0 | 7 | 0.6 | -0.5 | 0.8 |
| 44617 | 46.9 | -41.1 | P | 110 | 0 | 35 | 2.2 | 3.6 | 4.2 |
| 44620 | 44.4 | -39.3 | P | 78 | 0 | 4 | 1.5 | 1.9 | 2.4 |
| 44627 | 32.8 | -16.5 | P | 289 | 0 | 6 | 1.2 | -1.0 | 1.6 |
| 44721 | 33.8 | -31.8 | P | 689 | 0 | 0 | 0.7 | -0.4 | 0.8 |
| 44723 | 42.5 | -15.7 | P | 823 | 0 | 19 | 0.9 | 0.2 | 0.9 |
| 44726 | 60.9 | -39.7 | P | 1452 | 0 | 51 | 1.8 | -0.3 | 1.8 |
| 44730 | 53.3 | -34.3 | P | 706 | 0 | 0 | 1.0 | -0.4 | 1.0 |
| 44763 | 39.0 | -9.5 | P | 69 | 0 | 0 | 0.6 | 0.4 | 0.7 |
| 44764 | 56.4 | -22.6 | P | 1680 | 0 | 58 | 1.5 | -0.1 | 1.5 |
| 44767 | 58.0 | -11.0 | P | 1368 | 0 | 50 | 0.8 | 0.0 | 0.8 |
| 44768 | 46.2 | -25.5 | P | 612 | 0 | 57 | 1.3 | 1.5 | 2.0 |
| 44769 | 62.0 | -32.6 | P | 1661 | 0 | 59 | 1.6 | -0.7 | 1.7 |
| 44773 | 44.4 | -18.5 | P | 645 | 0 | 3 | 1.9 | 0.3 | 1.9 |
| 44774 | 46.7 | -17.0 | P | 178 | 0 | 10 | 0.7 | -0.2 | 0.7 |
| 44776 | 48.4 | -25.9 | P | 261 | 0 | 14 | 1.2 | -0.1 | 1.2 |
| 44780 | 65.0 | -32.0 | P | 551 | 0 | 41 | 1.1 | -0.5 | 1.2 |
| 47554 | 73.1 | -76.3 | P | 504 | 0 | 30 | 0.8 | 0.1 | 0.8 |
| 48589 | 69.4 | -23.4 | P | 419 | 0 | 0 | 1.2 | -0.2 | 1.2 |
| 62501 | 29.2 | -36.7 | P | 697 | 0 | 1 | 0.6 | 0.6 | 0.9 |
| 62503 | 32.4 | -38.1 | P | 73 | 0 | 0 | 0.7 | -0.8 | 1.0 |
| 62505 | 61.9 | -15.6 | P | 1905 | 0 | 64 | 1.1 | 0.0 | 1.1 |
| 62508 | 45.6 | -5.3 | P | 708 | 0 | 0 | 0.5 | -0.5 | 0.8 |
| 62512 | 38.1 | -9.2 | P | 821 | 0 | 21 | 1.0 | -0.2 | 1.1 |
| 62513 | 36.3 | -28.1 | P | 692 | 0 | 0 | 0.7 | 0.4 | 0.8 |
| 62514 | 33.1 | -24.8 | P | 690 | 0 | 0 | 0.8 | 0.1 | 0.8 |
| 62515 | 27.6 | -25.5 | P | 717 | 0 | 0 | 0.5 | 0.0 | 0.5 |
| 62517 | 34.9 | -22.0 | P | 1210 | 0 | 42 | 0.6 | -0.2 | 0.7 |
| 62519 | 46.1 | -3.8 | P | 656 | 0 | 2 | 0.7 | -0.4 | 0.8 |
| 62599 | 54.3 | -14.7 | P | 329 | 0 | 24 | 0.7 | -0.1 | 0.8 |
| 62600 | 51.0 | -16.1 | P | 328 | 0 | 18 | 0.6 | -0.1 | 0.6 |
| 62696 | 60.9 | -20.3 | P | 1288 | 0 | 48 | 1.7 | 0.0 | 1.7 |
| 62711 | 58.7 | -55.8 | P | 991 | 0 | 37 | 1.6 | 0.3 | 1.6 |
| 62712 | 62.5 | -37.9 | P | 1448 | 0 | 51 | 1.5 | 0.1 | 1.5 |
| 62713 | 52.9 | -20.4 | P | 34 | 6 | 9 | 2.5 | 0.8 | 2.7 |
| 62714 | 46.9 | -32.3 | P | 682 | 0 | 2 | 1.4 | 0.9 | 1.7 |

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 62801 | 39.8 | -24.7 | P | 482 | 0 | 1 | 0.8 | 0.4 | 0.9 |
| 62802 | 42.5 | -23.0 | P | 469 | 0 | 1 | 0.9 | 1.0 | 1.3 |
| 62803 | 45.2 | -15.9 | P | 442 | 1 | 12 | 2.7 | 1.0 | 2.9 |
| 62804 | 45.2 | -18.8 | P | 458 | 0 | 0 | 0.8 | -0.8 | 1.1 |
| 62805 | 41.4 | -26.5 | P | 42 | 100 | 100 | | | |
| 64522 | 64.4 | -35.5 | P | 423 | 19 | 23 | 2.5 | -0.7 | 2.6 |
| WIND SPEED | | | | | | | | | |
| 41503 | 13.9 | -66.8 | SPEED | 557 | 0 | 100 | 1.2 | -0.2 | 1.2 |
| 41522 | 22.3 | -55.4 | SPEED | 611 | 0 | 100 | 1.5 | -0.1 | 1.6 |
| 41531 | 23.1 | -67.1 | SPEED | 640 | 0 | 100 | 1.5 | -0.4 | 1.6 |
| 41532 | 24.7 | -70.4 | SPEED | 901 | 0 | 100 | 1.6 | 0.0 | 1.6 |
| 41534 | 26.7 | -62.6 | SPEED | 633 | 0 | 100 | 1.5 | -0.2 | 1.5 |
| 41537 | 27.2 | -68.6 | SPEED | 604 | 0 | 100 | 2.1 | -0.3 | 2.1 |
| 41648 | 25.2 | -71.1 | SPEED | 722 | 0 | 100 | 1.5 | 0.5 | 1.6 |
| 44585 | 42.1 | -69.1 | SPEED | 186 | 1 | 100 | 3.0 | 2.2 | 3.7 |
| 44601 | 34.4 | -42.8 | SPEED | 713 | 0 | 100 | 2.6 | -0.1 | 2.6 |
| 44615 | 43.3 | -47.8 | SPEED | 478 | 0 | 100 | 2.5 | 0.7 | 2.6 |
| 44617 | 46.9 | -41.1 | SPEED | 1 | 0 | 100 | 0.0 | 6.4 | 6.4 |
| 44620 | 44.4 | -39.3 | SPEED | 445 | 1 | 100 | 3.1 | 1.0 | 3.3 |
| 62711 | 58.7 | -55.8 | SPEED | 984 | 0 | 100 | 2.6 | 1.1 | 2.8 |
| WIND DIRECTION | | | | | | | | | |
| 41503 | 13.9 | -66.8 | DIRN. | 400 | 0 | 0 | 10.6 | -8.6 | 13.6 |
| 41522 | 22.3 | -55.4 | DIRN. | 238 | 0 | 0 | 16.5 | -0.5 | 16.5 |
| 41531 | 23.1 | -67.1 | DIRN. | 298 | 1 | 0 | 17.4 | 16.1 | 23.7 |
| 41532 | 24.7 | -70.4 | DIRN. | 374 | 0 | 0 | 15.1 | 18.9 | 24.2 |
| 41534 | 26.7 | -62.6 | DIRN. | 370 | 0 | 0 | 16.1 | 6.5 | 17.4 |
| 41537 | 27.2 | -68.6 | DIRN. | 346 | 1 | 0 | 25.9 | -21.3 | 33.5 |
| 41648 | 25.2 | -71.1 | DIRN. | 393 | 0 | 0 | 27.1 | 59.3 | 65.2 |
| 44585 | 42.1 | -69.1 | DIRN. | 119 | 1 | 0 | 24.3 | 31.7 | 39.9 |
| 44601 | 34.4 | -42.8 | DIRN. | 586 | 0 | 0 | 23.1 | 5.3 | 23.7 |
| 44615 | 43.3 | -47.8 | DIRN. | 378 | 0 | 0 | 19.6 | -39.0 | 43.6 |
| 44620 | 44.4 | -39.3 | DIRN. | 422 | 1 | 0 | 16.2 | 40.6 | 43.8 |
| 62711 | 58.7 | -55.8 | DIRN. | 888 | 0 | 0 | 24.8 | -5.9 | 25.5 |

## TABLE 9

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures:**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Statistics for each airline carrier. |
| **Area monitored** | | :40°N - 70°N, 60°W - 0°W. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :All hours combined. |
| **Level(s) monitored** | | :300.0 - 150.0 hPa |
| **Elements monitored** | | :TEMP in °C ; WIND in m s$^{-1}$ |
| **Parameters monitored** | :N REP. | :Number of observations received excluding duplicates. |
| | :PG | :Percentage of observations with gross errors. |
| | :PR | :Percentage of observations rejected by quality control including rejections from the duplicate check. |
| | :PC | :Percentage of observations with calm winds. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind. |

**GROSS ERROR LIMITS** :10.0 °C ; 60 m s$^{-1}$ Vector Wind

**SELECTION CRITERIA** :N REP $\geq$ 20

**NB :** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAL | 593 | 1 | 7 | 1.8 | 0.0 | 490 | 0 | 8 | 0 | 7.4 | 0.5 |
| ACA | 1137 | 0 | 2 | 1.6 | -0.4 | 1108 | 0 | 2 | 0 | 6.9 | 0.5 |
| AEA | 190 | 1 | 2 | 1.8 | 0.6 | 82 | 0 | 2 | 0 | 6.2 | 0.7 |
| AEL | 595 | 0 | 10 | 2.1 | -0.4 | 479 | 0 | 11 | 0 | 8.8 | 0.4 |
| AFL | 279 | 0 | 5 | 2.1 | 0.8 | 265 | 0 | 2 | 0 | 7.3 | 0.5 |
| AFR | 1147 | 0 | 8 | 1.6 | 0.1 | 920 | 0 | 8 | 0 | 7.1 | 0.4 |
| AIS | 289 | 0 | 11 | 2.0 | -0.5 | 257 | 0 | 12 | 0 | 9.0 | 0.0 |
| AJM | 266 | 1 | 5 | 1.6 | -0.4 | 214 | 0 | 4 | 0 | 8.6 | 0.8 |
| AMM | 64 | 2 | 6 | 1.2 | 0.1 | 52 | 0 | 10 | 0 | 7.7 | 1.0 |
| AMT | 70 | 0 | 9 | 1.1 | -0.3 | 69 | 0 | 10 | 0 | 7.7 | 1.3 |
| AMX | 208 | 2 | 4 | 1.8 | -0.1 | 148 | 0 | 3 | 0 | 8.4 | 0.4 |
| AZA | 365 | 1 | 8 | 2.2 | 0.2 | 332 | 1 | 10 | 0 | 10.1 | 0.5 |
| BAL | 84 | 1 | 7 | 1.5 | -0.3 | 74 | 0 | 11 | 0 | 8.2 | 0.4 |
| BAW | 504 | 0 | 10 | 1.9 | -0.5 | 485 | 0 | 11 | 0 | 7.3 | 0.7 |
| BHP | 21 | 0 | 14 | 1.1 | -0.7 | 20 | 5 | 20 | 0 | 10.0 | 0.6 |
| BPA | 101 | 0 | 53 | 2.2 | 0.9 | 73 | 0 | 12 | 0 | 12.7 | -1.1 |
| BWA | 134 | 1 | 7 | 1.9 | -0.6 | 94 | 1 | 6 | 0 | 6.3 | 0.0 |
| CFC | 27 | 0 | 11 | 1.5 | 0.5 | 28 | 0 | 25 | 0 | 11.8 | 2.7 |
| CFG | 570 | 0 | 4 | 1.7 | -0.7 | 453 | 0 | 5 | 0 | 6.9 | 0.6 |
| CGA | 158 | 0 | 1 | 1.2 | -0.3 | 157 | 0 | 0 | 0 | 3.8 | 0.9 |
| CGF | 56 | 0 | 2 | 1.5 | -0.6 | 55 | 0 | 2 | 0 | 4.0 | 0.4 |
| CGH | 99 | 0 | 2 | 1.7 | -0.6 | 96 | 0 | 1 | 0 | 4.4 | 0.7 |
| CKS | 82 | 0 | 2 | 2.0 | 0.2 | 88 | 0 | 6 | 0 | 6.4 | 0.9 |
| CLX | 281 | 0 | 1 | 1.5 | -0.5 | 267 | 0 | 3 | 0 | 7.5 | -0.1 |
| COA | 124 | 0 | 29 | 1.6 | -0.2 | 90 | 0 | 29 | 0 | 7.7 | 0.8 |
| CRL | 332 | 1 | 5 | 2.0 | 0.7 | 236 | 0 | 3 | 0 | 6.6 | 0.4 |
| CUB | 106 | 1 | 68 | 1.8 | 1.0 | 71 | 0 | 35 | 0 | 8.3 | 0.9 |
| DAB | 253 | 0 | 23 | 1.3 | -0.4 | 244 | 0 | 23 | 0 | 3.9 | 0.5 |
| DAI | 335 | 0 | 19 | 1.3 | 0.2 | 327 | 0 | 19 | 0 | 4.7 | 0.6 |
| DAL | 698 | 1 | 14 | 1.7 | -0.7 | 662 | 0 | 16 | 0 | 7.5 | 0.7 |
| DBR | 26 | 0 | 0 | 1.3 | -0.1 | 24 | 0 | 4 | 0 | 7.2 | -1.4 |
| DCE | 104 | 0 | 10 | 1.1 | -0.1 | 84 | 0 | 13 | 0 | 6.9 | 0.5 |
| DCS | 37 | 0 | 3 | 1.2 | -0.1 | 37 | 0 | 5 | 0 | 7.3 | 1.0 |
| DHL | 105 | 1 | 100 | 6.4 | -6.3 | 103 | 0 | 5 | 0 | 10.6 | 3.0 |
| DLH | 755 | 0 | 12 | 1.6 | 0.1 | 744 | 0 | 12 | 0 | 7.1 | 0.5 |
| EDW | 66 | 2 | 3 | 1.9 | -0.2 | 58 | 2 | 2 | 0 | 5.3 | 0.8 |
| EEZ | 32 | 0 | 13 | 1.0 | 0.1 | 32 | 0 | 16 | 0 | 5.7 | 1.1 |
| EIA | 248 | 4 | 100 | 4.0 | 1.6 | 245 | 1 | 100 | 0 | 19.1 | 5.9 |
| ELY | 124 | 0 | 2 | 1.6 | -0.1 | 123 | 0 | 5 | 0 | 8.1 | 0.4 |
| ETH | 23 | 0 | 22 | 1.5 | 0.7 | 21 | 0 | 24 | 0 | 5.0 | 0.5 |
| FDX | 610 | 1 | 34 | 1.6 | 0.0 | 616 | 0 | 34 | 0 | 8.7 | 0.4 |
| FGS | 181 | 0 | 0 | 1.5 | 0.4 | 175 | 0 | 0 | 0 | 4.6 | 0.5 |
| FGZ | 104 | 0 | 2 | 1.2 | -0.3 | 101 | 0 | 2 | 0 | 4.4 | 0.7 |
| FIN | 212 | 0 | 3 | 1.4 | 0.2 | 199 | 0 | 4 | 0 | 5.9 | 0.7 |
| GAF | 20 | 0 | 10 | 1.7 | -0.2 | 20 | 0 | 5 | 0 | 4.8 | 0.5 |
| GCO | 439 | 1 | 9 | 1.8 | 0.0 | 442 | 0 | 20 | 0 | 12.9 | 3.1 |
| GRL | 71 | 0 | 0 | 1.1 | 0.0 | 63 | 0 | 0 | 0 | 4.4 | -0.1 |
| GTI | 290 | 1 | 14 | 2.0 | 0.1 | 274 | 0 | 15 | 0 | 8.9 | 0.2 |
| GVA | 41 | 0 | 2 | 1.2 | 0.1 | 40 | 0 | 3 | 0 | 4.1 | 0.5 |
| GVB | 48 | 0 | 2 | 1.4 | 0.5 | 48 | 0 | 4 | 0 | 5.0 | 0.3 |
| GVF | 22 | 5 | 18 | 3.3 | -0.3 | 20 | 0 | 0 | 0 | 4.0 | 2.0 |
| GVG | 63 | 0 | 2 | 1.1 | -0.1 | 61 | 0 | 2 | 0 | 4.2 | 0.3 |
| GVH | 51 | 0 | 2 | 1.0 | -0.3 | 51 | 0 | 2 | 0 | 4.1 | 0.1 |
| GVL | 53 | 0 | 0 | 1.2 | -0.3 | 51 | 0 | 0 | 0 | 4.8 | 0.6 |
| GVR | 122 | 0 | 0 | 1.3 | -0.2 | 117 | 0 | 0 | 0 | 4.6 | 0.8 |
| GVT | 26 | 0 | 0 | 1.2 | -0.4 | 26 | 0 | 0 | 0 | 4.8 | -0.6 |
| GVW | 23 | 0 | 0 | 1.5 | -1.1 | 23 | 0 | 0 | 0 | 4.4 | 0.3 |
| GVX | 25 | 0 | 8 | 1.5 | 0.4 | 25 | 0 | 8 | 0 | 3.9 | 0.3 |
| GWW | 68 | 0 | 4 | 1.2 | -0.4 | 66 | 0 | 5 | 0 | 4.6 | 0.7 |

| | | TEMPERATURE | | | | | WIND | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| GYM | 32 | 0 | 0 | 1.0 | 0.0 | 31 | 0 | 0 | 0 | 4.6 | 0.9 |
| IBE | 1104 | 1 | 7 | 1.8 | 0.4 | 667 | 0 | 8 | 0 | 7.5 | 0.7 |
| ICE | 709 | 0 | 3 | 1.5 | -0.2 | 679 | 0 | 2 | 0 | 6.6 | 0.7 |
| IRL | 27 | 0 | 7 | 2.4 | 1.2 | 26 | 0 | 8 | 0 | 7.0 | 1.0 |
| IWD | 99 | 1 | 2 | 1.4 | -0.1 | 37 | 0 | 3 | 0 | 5.7 | 1.3 |
| KLM | 1119 | 0 | 3 | 1.8 | 0.0 | 1006 | 0 | 4 | 0 | 8.0 | 0.3 |
| LAN | 34 | 0 | 6 | 2.0 | 0.4 | 31 | 0 | 10 | 0 | 11.1 | 0.2 |
| LDI | 308 | 0 | 3 | 1.8 | -0.9 | 221 | 0 | 4 | 0 | 9.9 | 0.2 |
| LOT | 94 | 2 | 3 | 1.5 | -1.0 | 93 | 0 | 5 | 0 | 7.0 | 0.1 |
| LTU | 508 | 2 | 6 | 1.6 | -0.1 | 414 | 0 | 5 | 0 | 7.5 | 0.6 |
| MAS | 28 | 0 | 0 | 1.1 | 0.1 | 25 | 0 | 0 | 0 | 4.7 | 0.0 |
| MON | 69 | 0 | 0 | 1.2 | -0.1 | 59 | 0 | 3 | 0 | 7.8 | 0.6 |
| MPD | 134 | 0 | 4 | 2.0 | 0.4 | 69 | 0 | 6 | 0 | 9.7 | 0.1 |
| MPH | 359 | 0 | 1 | 1.8 | -0.8 | 335 | 0 | 2 | 0 | 8.2 | 0.1 |
| MYT | 120 | 1 | 6 | 1.9 | 0.1 | 94 | 1 | 6 | 0 | 8.4 | 0.7 |
| NAO | 24 | 0 | 17 | 2.4 | 0.2 | 25 | 0 | 8 | 0 | 4.9 | 0.4 |
| NCA | 33 | 0 | 3 | 1.8 | 0.6 | 30 | 0 | 3 | 0 | 6.5 | 0.9 |
| NWA | 2844 | 0 | 3 | 1.6 | 0.3 | 2835 | 0 | 3 | 0 | 6.6 | 0.4 |
| OAE | 120 | 0 | 6 | 1.7 | 0.1 | 119 | 1 | 100 | 0 | 12.0 | 2.8 |
| OYK | 21 | 0 | 67 | 0.8 | -0.2 | 21 | 0 | 67 | 0 | 3.8 | 0.6 |
| PAC | 322 | 1 | 5 | 1.8 | 0.2 | 321 | 0 | 6 | 0 | 7.5 | 0.2 |
| RAM | 183 | 1 | 5 | 1.9 | -0.1 | 103 | 0 | 5 | 0 | 11.7 | 1.0 |
| RCH | 768 | 2 | 17 | 2.0 | 0.1 | 693 | 0 | 100 | 0 | 10.0 | 1.9 |
| RJA | 23 | 0 | 4 | 2.1 | -0.5 | 23 | 0 | 0 | 0 | 6.1 | 1.0 |
| RZO | 57 | 2 | 5 | 1.5 | -0.2 | 39 | 3 | 10 | 0 | 8.0 | 0.7 |
| SEU | 115 | 0 | 4 | 2.1 | -0.3 | 105 | 0 | 5 | 0 | 8.4 | 1.8 |
| SLR | 165 | 0 | 8 | 1.1 | 0.0 | 157 | 0 | 10 | 0 | 7.3 | 0.0 |
| SVA | 40 | 3 | 8 | 1.5 | -0.2 | 47 | 0 | 4 | 0 | 6.4 | 0.2 |
| TAP | 224 | 0 | 4 | 1.4 | -0.6 | 107 | 1 | 7 | 0 | 8.3 | 0.5 |
| TSC | 68 | 3 | 12 | 2.4 | -0.1 | 54 | 0 | 11 | 0 | 6.1 | 1.6 |
| UAL | 456 | 0 | 58 | 2.1 | -1.2 | 423 | 0 | 61 | 0 | 7.1 | 0.5 |
| UPS | 994 | 1 | 37 | 1.7 | -0.2 | 967 | 1 | 38 | 0 | 7.4 | 0.5 |
| USA | 157 | 1 | 6 | 1.9 | 0.0 | 129 | 0 | 3 | 0 | 6.7 | 0.6 |
| VIR | 224 | 0 | 4 | 1.7 | -0.4 | 219 | 0 | 6 | 0 | 7.2 | 0.9 |
| WOA | 287 | 0 | 4 | 1.6 | -0.1 | 275 | 0 | 11 | 0 | 9.8 | 1.8 |
| 9VS | 153 | 0 | 3 | 1.4 | -0.5 | 143 | 0 | 2 | 0 | 4.5 | 0.5 |
| EU | 46256 | 0 | 25 | 1.2 | 0.1 | 46256 | 0 | 26 | 0 | 4.5 | 0.5 |
| KL | 1040 | 0 | 19 | 1.1 | 0.5 | 1031 | 0 | 19 | 0 | 5.0 | 0.9 |
| LH | 194 | 0 | 28 | 1.8 | 1.4 | 194 | 0 | 28 | 0 | 4.8 | 0.7 |
| TN | 26 | 0 | 4 | 2.2 | 0.4 | 26 | 0 | 8 | 0 | 8.0 | 2.2 |
| N | 2447 | 0 | 13 | 1.6 | -0.1 | 2372 | 0 | 12 | 0 | 5.0 | 0.7 |
| US ACARS | 24064 | 8 | 38 | 1.4 | 0.1 | 24064 | 0 | 31 | 0 | 5.1 | 0.6 |

## TABLE 10

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from selected radiosonde TEMPs.

**Area monitored** :0°N - 90°N, 100°W - 40°E

**Standard of comparison** :Background field from UKMO global model.

**Position** :Average latitude and longitude for period.

**Observation times** :00, 12 UTC.

**Level monitored** :100 hPa.

**Element monitored** :GEOPOTENTIAL HEIGHT in metres

| | | |
|---|---|---|
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.1

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | SD | RMS | BIAS |
|---|---|---|---|---|---|---|---|---|
| DASAP1 | 12 | Z | 100 | 2 | 0 | 6.5 | 7.9 | 4.5 |
| DBLK | 00 | Z | 100 | 2 | 0 | 5.0 | 5.4 | -2.0 |
| DBLK | 12 | Z | 100 | 16 | 0 | 9.8 | 9.9 | -1.8 |
| EBUQ | 12 | Z | 100 | 22 | 0 | 10.4 | 12.9 | 7.5 |
| ELML7 | 00 | Z | 100 | 13 | 0 | 16.3 | 23.9 | 17.5 |
| ELML7 | 12 | Z | 100 | 11 | 0 | 12.3 | 33.1 | 30.7 |
| FNPH | 00 | Z | 100 | 1 | 0 | 0.0 | 48.0 | -48.0 |
| FNPH | 12 | Z | 100 | 6 | 0 | 17.6 | 32.2 | -27.0 |
| FNRS | 00 | Z | 100 | 7 | 0 | 22.5 | 38.2 | -30.9 |
| FNRS | 12 | Z | 100 | 2 | 1 | 1.5 | 18.6 | -18.5 |
| LDWR | 00 | Z | 100 | 30 | 0 | 9.6 | 22.0 | -19.8 |
| LDWR | 12 | Z | 100 | 30 | 0 | 41.8 | 44.8 | -16.1 |
| OXTS2 | 00 | Z | 100 | 4 | 0 | 11.4 | 41.6 | -40.0 |
| OXTS2 | 12 | Z | 100 | 3 | 0 | 7.3 | 45.9 | -45.3 |
| OXYH2 | 00 | Z | 100 | 4 | 0 | 16.7 | 16.7 | 0.0 |
| OXYH2 | 12 | Z | 100 | 3 | 1 | 25.5 | 36.4 | -26.0 |
| V2XM | 00 | Z | 100 | 1 | 0 | 0.0 | 3.0 | -3.0 |
| V2XM | 12 | Z | 100 | 2 | 0 | 14.5 | 17.3 | -9.5 |
| WPKD | 00 | Z | 100 | 7 | 0 | 42.0 | 46.2 | -19.3 |
| WPKD | 12 | Z | 100 | 7 | 1 | 10.9 | 11.7 | -4.3 |
| ZCBP6 | 00 | Z | 100 | 7 | 0 | 18.2 | 18.3 | 2.4 |
| ZCBP6 | 12 | Z | 100 | 6 | 0 | 12.5 | 18.5 | 13.7 |
| 03953 | 00 | Z | 100 | 30 | 0 | 13.2 | 13.2 | -1.5 |
| 03953 | 12 | Z | 100 | 31 | 0 | 11.0 | 11.4 | -2.8 |
| 04018 | 00 | Z | 100 | 29 | 0 | 11.4 | 19.3 | -15.6 |
| 04018 | 12 | Z | 100 | 31 | 0 | 13.1 | 17.6 | -11.7 |
| 04220 | 00 | Z | 100 | 30 | 0 | 12.0 | 27.9 | -25.2 |
| 04220 | 12 | Z | 100 | 29 | 1 | 10.3 | 31.7 | -30.0 |
| 04270 | 00 | Z | 100 | 28 | 1 | 9.5 | 19.5 | -17.1 |
| 04270 | 12 | Z | 100 | 30 | 0 | 14.6 | 22.7 | -17.4 |
| 04339 | 00 | Z | 100 | 30 | 0 | 10.1 | 20.3 | -17.6 |
| 04339 | 12 | Z | 100 | 31 | 0 | 10.7 | 21.0 | -18.0 |
| 04360 | 00 | Z | 100 | 29 | 0 | 11.5 | 22.9 | -19.8 |
| 04360 | 12 | Z | 100 | 31 | 0 | 10.3 | 23.5 | -21.1 |
| 08001 | 00 | Z | 100 | 28 | 0 | 22.7 | 23.6 | -6.5 |
| 08001 | 12 | Z | 100 | 31 | 0 | 18.4 | 21.3 | -10.7 |
| 08508 | 12 | Z | 100 | 30 | 0 | 14.0 | 26.1 | 22.0 |
| 08594 | 12 | Z | 100 | 28 | 0 | 21.9 | 21.9 | -0.3 |
| 71600 | 00 | Z | 100 | 30 | 0 | 16.7 | 26.5 | -20.6 |
| 71600 | 12 | Z | 100 | 31 | 0 | 17.0 | 21.2 | -12.6 |
| 72201 | 00 | Z | 100 | 30 | 0 | 11.0 | 33.8 | -31.9 |
| 72201 | 12 | Z | 100 | 31 | 0 | 11.4 | 25.2 | -22.5 |
| 72402 | 00 | Z | 100 | 29 | 0 | 23.5 | 25.3 | 9.3 |
| 72402 | 12 | Z | 100 | 30 | 1 | 20.4 | 33.1 | 26.0 |
| 74494 | 00 | Z | 100 | 25 | 0 | 19.0 | 19.9 | -5.9 |
| 74494 | 12 | Z | 100 | 22 | 0 | 18.5 | 24.4 | -15.8 |
| 78016 | 00 | Z | 100 | 29 | 0 | 12.2 | 33.6 | 31.3 |
| 78016 | 12 | Z | 100 | 29 | 0 | 22.6 | 41.6 | 34.9 |

## TABLE 11

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures:**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :500 hPa. |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT in metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.1

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | SD | RMS | BIAS |
|---|---|---|---|---|---|---|---|---|
| DASAP1 | 12 | Z | 500 | 3 | 0 | 4.5 | 6.5 | -4.7 |
| DBLK | 00 | Z | 500 | 2 | 0 | 6.0 | 10.8 | 9.0 |
| DBLK | 12 | Z | 500 | 16 | 0 | 11.8 | 12.7 | 4.8 |
| EBUQ | 12 | Z | 500 | 23 | 0 | 5.9 | 6.1 | -1.5 |
| ELML7 | 00 | Z | 500 | 14 | 0 | 5.3 | 6.2 | -3.1 |
| ELML7 | 12 | Z | 500 | 12 | 0 | 8.2 | 8.8 | 3.2 |
| FNPH | 00 | Z | 500 | 8 | 0 | 7.4 | 14.1 | -12.0 |
| FNPH | 12 | Z | 500 | 10 | 0 | 8.5 | 12.4 | -9.0 |
| FNRS | 00 | Z | 500 | 9 | 1 | 7.6 | 23.4 | -22.1 |
| FNRS | 12 | Z | 500 | 9 | 1 | 10.7 | 23.6 | -21.0 |
| LDWR | 00 | Z | 500 | 30 | 0 | 7.4 | 8.2 | 3.4 |
| LDWR | 12 | Z | 500 | 30 | 0 | 16.9 | 17.1 | 2.5 |
| OXTS2 | 00 | Z | 500 | 4 | 0 | 2.6 | 13.7 | -13.5 |
| OXTS2 | 12 | Z | 500 | 3 | 0 | 8.7 | 27.7 | -26.3 |
| OXYH2 | 00 | Z | 500 | 6 | 0 | 9.8 | 11.9 | 6.8 |
| OXYH2 | 12 | Z | 500 | 4 | 1 | 16.8 | 16.9 | -1.0 |
| V2XM | 00 | Z | 500 | 1 | 0 | 0.0 | 12.0 | 12.0 |
| V2XM | 12 | Z | 500 | 2 | 0 | 3.0 | 3.6 | 2.0 |
| WPKD | 00 | Z | 500 | 7 | 0 | 5.8 | 7.1 | -4.1 |
| WPKD | 12 | Z | 500 | 7 | 1 | 7.5 | 7.5 | -1.1 |
| ZCBP6 | 00 | Z | 500 | 8 | 0 | 19.3 | 19.9 | 5.0 |
| ZCBP6 | 12 | Z | 500 | 6 | 0 | 13.9 | 20.2 | 14.7 |
| 03953 | 00 | Z | 500 | 30 | 0 | 7.9 | 8.3 | 2.6 |
| 03953 | 12 | Z | 500 | 31 | 0 | 8.8 | 8.9 | 1.4 |
| 04018 | 00 | Z | 500 | 30 | 0 | 8.9 | 9.5 | 3.4 |
| 04018 | 12 | Z | 500 | 31 | 0 | 9.4 | 10.4 | 4.4 |
| 04220 | 00 | Z | 500 | 30 | 0 | 7.5 | 7.8 | 2.3 |
| 04220 | 12 | Z | 500 | 29 | 1 | 8.7 | 9.0 | -2.1 |
| 04270 | 00 | Z | 500 | 28 | 1 | 8.1 | 10.2 | 6.1 |
| 04270 | 12 | Z | 500 | 30 | 0 | 12.3 | 12.7 | 3.2 |
| 04339 | 00 | Z | 500 | 30 | 0 | 8.5 | 10.4 | 6.0 |
| 04339 | 12 | Z | 500 | 31 | 0 | 11.7 | 11.8 | 1.4 |
| 04360 | 00 | Z | 500 | 29 | 0 | 9.1 | 9.1 | 0.7 |
| 04360 | 12 | Z | 500 | 31 | 0 | 9.3 | 9.3 | 0.5 |
| 08001 | 00 | Z | 500 | 30 | 0 | 12.7 | 13.0 | -2.7 |
| 08001 | 12 | Z | 500 | 31 | 0 | 13.4 | 16.0 | -8.7 |
| 08508 | 12 | Z | 500 | 30 | 0 | 9.7 | 9.8 | -1.1 |
| 08594 | 12 | Z | 500 | 28 | 0 | 8.9 | 13.0 | -9.5 |
| 71600 | 00 | Z | 500 | 30 | 0 | 10.1 | 12.0 | -6.5 |
| 71600 | 12 | Z | 500 | 31 | 0 | 8.3 | 8.8 | -2.8 |
| 72201 | 00 | Z | 500 | 30 | 0 | 5.7 | 8.8 | -6.6 |
| 72201 | 12 | Z | 500 | 31 | 0 | 6.4 | 11.2 | -9.2 |
| 72402 | 00 | Z | 500 | 29 | 0 | 10.5 | 10.5 | 0.0 |
| 72402 | 12 | Z | 500 | 31 | 0 | 8.8 | 9.5 | -3.6 |
| 74494 | 00 | Z | 500 | 30 | 0 | 11.3 | 12.2 | -4.5 |
| 74494 | 12 | Z | 500 | 31 | 0 | 9.4 | 11.6 | -6.8 |
| 78016 | 00 | Z | 500 | 30 | 0 | 8.2 | 12.4 | 9.3 |
| 78016 | 12 | Z | 500 | 31 | 0 | 10.8 | 13.5 | 8.1 |

# TABLE 12

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :100 hPa. |
| **Element monitored** | | :VECTOR WIND in $m\ s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS | :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.2 | |

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | % REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| DASAP1 | 12 | V | 100 | 2 | 0 | 0 | 1.7 | -0.4 | -0.3 |
| DBLK | 00 | V | 100 | 2 | 0 | 0 | 1.4 | -0.3 | 0.9 |
| DBLK | 12 | V | 100 | 17 | 0 | 0 | 3.4 | 0.6 | 1.6 |
| EBUQ | 12 | V | 100 | 21 | 0 | 0 | 5.7 | 0.3 | -0.3 |
| ELML7 | 00 | V | 100 | 12 | 0 | 0 | 4.9 | -0.1 | -0.1 |
| ELML7 | 12 | V | 100 | 10 | 0 | 0 | 4.5 | -0.1 | -0.1 |
| FNPH | 00 | V | 100 | 1 | 0 | 0 | 1.4 | -1.2 | 0.7 |
| FNPH | 12 | V | 100 | 6 | 0 | 0 | 3.9 | 1.5 | 1.2 |
| FNRS | 00 | V | 100 | 7 | 0 | 0 | 6.2 | -1.0 | -0.3 |
| FNRS | 12 | V | 100 | 3 | 0 | 0 | 6.3 | 4.3 | -1.2 |
| LDWR | 00 | V | 100 | 29 | 0 | 0 | 3.1 | 0.2 | -0.9 |
| LDWR | 12 | V | 100 | 30 | 0 | 0 | 3.5 | 0.3 | -0.4 |
| OXTS2 | 00 | V | 100 | 3 | 0 | 0 | 5.2 | -0.6 | 3.6 |
| OXTS2 | 12 | V | 100 | 3 | 0 | 33 | 13.4 | 0.6 | -6.1 |
| OXYH2 | 00 | V | 100 | 1 | 0 | 0 | 4.2 | 3.8 | -1.8 |
| OXYH2 | 12 | V | 100 | 2 | 0 | 0 | 4.7 | 2.5 | -1.8 |
| V2XM | 00 | V | 100 | 1 | 0 | 0 | 1.5 | 1.4 | 0.6 |
| V2XM | 12 | V | 100 | 2 | 0 | 0 | 3.1 | -1.1 | 1.3 |
| WPKD | 00 | V | 100 | 6 | 0 | 0 | 2.6 | -0.8 | 0.7 |
| WPKD | 12 | V | 100 | 7 | 0 | 0 | 6.0 | 1.1 | -0.2 |
| ZCBP6 | 00 | V | 100 | 7 | 0 | 0 | 3.2 | 1.7 | 0.1 |
| ZCBP6 | 12 | V | 100 | 3 | 0 | 0 | 3.5 | -0.6 | 1.4 |
| 03953 | 00 | V | 100 | 30 | 0 | 0 | 3.1 | 0.5 | 1.2 |
| 03953 | 12 | V | 100 | 31 | 0 | 0 | 2.4 | 0.9 | 0.2 |
| 04018 | 00 | V | 100 | 28 | 0 | 3 | 4.2 | 0.1 | 0.2 |
| 04018 | 12 | V | 100 | 29 | 0 | 0 | 3.4 | 0.0 | 0.1 |
| 04220 | 00 | V | 100 | 30 | 0 | 0 | 3.1 | 0.0 | 0.0 |
| 04220 | 12 | V | 100 | 29 | 0 | 0 | 2.7 | -0.2 | 0.0 |
| 04270 | 00 | V | 100 | 26 | 0 | 0 | 4.3 | 0.5 | 0.3 |
| 04270 | 12 | V | 100 | 30 | 0 | 0 | 3.5 | 0.9 | 0.9 |
| 04339 | 00 | V | 100 | 24 | 0 | 4 | 6.9 | -0.7 | 1.2 |
| 04339 | 12 | V | 100 | 29 | 0 | 3 | 5.9 | 2.9 | -0.7 |
| 04360 | 00 | V | 100 | 29 | 0 | 0 | 4.3 | 0.5 | 1.5 |
| 04360 | 12 | V | 100 | 31 | 0 | 0 | 3.0 | 0.4 | 1.1 |
| 08001 | 00 | V | 100 | 27 | 0 | 0 | 3.8 | 0.8 | 0.9 |
| 08001 | 12 | V | 100 | 29 | 0 | 0 | 2.5 | -0.3 | -0.5 |
| 08508 | 12 | V | 100 | 22 | 0 | 0 | 4.8 | 0.6 | 1.2 |
| 08594 | 12 | V | 100 | 26 | 0 | 100 | 4.5 | -1.5 | 2.2 |
| 71600 | 00 | V | 100 | 29 | 0 | 0 | 3.8 | 0.8 | -0.4 |
| 71600 | 12 | V | 100 | 31 | 0 | 0 | 4.2 | -0.1 | 1.2 |
| 72201 | 00 | V | 100 | 30 | 0 | 0 | 3.8 | 0.7 | 0.8 |
| 72201 | 12 | V | 100 | 31 | 0 | 0 | 3.5 | 1.1 | 0.1 |
| 72402 | 00 | V | 100 | 29 | 0 | 0 | 4.4 | 1.3 | -0.2 |
| 72402 | 12 | V | 100 | 31 | 0 | 0 | 4.5 | 0.7 | -1.1 |
| 74494 | 00 | V | 100 | 25 | 0 | 100 | 3.3 | 0.1 | 0.0 |
| 74494 | 12 | V | 100 | 20 | 0 | 100 | 3.3 | -0.5 | 0.4 |
| 78016 | 00 | V | 100 | 27 | 0 | 0 | 6.1 | 0.8 | -0.8 |
| 78016 | 12 | V | 100 | 26 | 0 | 0 | 5.1 | 0.0 | 0.1 |

## TABLE 13

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: March 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :500 hPa. |
| **Element monitored** | | :VECTOR WIND in m s$^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS: | Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.2

| WMO<br>IDENT | OBS<br>TIME | ELM | LEV | NUM<br>OBS | NUM<br>GROSS | %<br>REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| DASAP1 | 12 | V | 500 | 3 | 0 | 0 | 3.0 | -0.7 | 2.5 |
| DBLK | 00 | V | 500 | 2 | 0 | 0 | 3.3 | 2.3 | 0.8 |
| DBLK | 12 | V | 500 | 17 | 0 | 0 | 4.8 | 1.3 | -0.4 |
| EBUQ | 12 | V | 500 | 21 | 0 | 0 | 4.1 | -0.4 | -0.6 |
| ELML7 | 00 | V | 500 | 14 | 0 | 0 | 4.0 | 0.2 | 0.7 |
| ELML7 | 12 | V | 500 | 11 | 0 | 0 | 3.6 | 0.4 | 0.0 |
| FNPH | 00 | V | 500 | 9 | 0 | 0 | 3.7 | -0.9 | 1.2 |
| FNPH | 12 | V | 500 | 10 | 0 | 0 | 4.3 | 0.2 | 0.8 |
| FNRS | 00 | V | 500 | 10 | 0 | 0 | 4.3 | 0.5 | 0.2 |
| FNRS | 12 | V | 500 | 10 | 0 | 0 | 4.2 | 0.6 | 1.4 |
| LDWR | 00 | V | 500 | 30 | 0 | 0 | 4.5 | 0.2 | 0.3 |
| LDWR | 12 | V | 500 | 30 | 0 | 0 | 4.2 | -0.7 | -0.9 |
| OXTS2 | 00 | V | 500 | 4 | 0 | 0 | 5.8 | -1.3 | 3.6 |
| OXTS2 | 12 | V | 500 | 3 | 0 | 33 | 11.5 | 0.4 | -5.1 |
| OXYH2 | 00 | V | 500 | 3 | 0 | 0 | 7.0 | -2.9 | 0.7 |
| OXYH2 | 12 | V | 500 | 4 | 0 | 0 | 4.9 | -1.2 | -1.9 |
| V2XM | 00 | V | 500 | 1 | 0 | 0 | 2.9 | 0.6 | 2.9 |
| V2XM | 12 | V | 500 | 2 | 0 | 0 | 1.4 | -0.1 | 0.5 |
| WPKD | 00 | V | 500 | 6 | 0 | 0 | 5.3 | -0.2 | 0.3 |
| WPKD | 12 | V | 500 | 7 | 0 | 0 | 5.1 | -0.2 | -1.2 |
| ZCBP6 | 00 | V | 500 | 7 | 0 | 0 | 3.3 | 1.0 | -0.1 |
| ZCBP6 | 12 | V | 500 | 3 | 0 | 0 | 4.0 | -0.1 | 2.0 |
| 03953 | 00 | V | 500 | 30 | 0 | 0 | 4.1 | 0.5 | 0.2 |
| 03953 | 12 | V | 500 | 31 | 0 | 0 | 4.3 | 1.5 | 0.0 |
| 04018 | 00 | V | 500 | 29 | 0 | 0 | 5.3 | 0.5 | -0.8 |
| 04018 | 12 | V | 500 | 30 | 0 | 0 | 4.3 | 0.8 | 0.1 |
| 04220 | 00 | V | 500 | 30 | 0 | 0 | 4.1 | 0.0 | -0.2 |
| 04220 | 12 | V | 500 | 30 | 0 | 0 | 5.1 | 0.6 | 0.1 |
| 04270 | 00 | V | 500 | 28 | 0 | 0 | 4.9 | 0.9 | -0.4 |
| 04270 | 12 | V | 500 | 30 | 0 | 0 | 4.6 | 0.4 | 0.7 |
| 04339 | 00 | V | 500 | 22 | 0 | 4 | 8.8 | -0.1 | 1.1 |
| 04339 | 12 | V | 500 | 31 | 0 | 0 | 6.2 | 0.9 | -0.2 |
| 04360 | 00 | V | 500 | 29 | 0 | 0 | 4.1 | -0.5 | -0.1 |
| 04360 | 12 | V | 500 | 31 | 0 | 0 | 4.3 | 0.5 | -0.2 |
| 08001 | 00 | V | 500 | 30 | 0 | 0 | 4.2 | -0.5 | -0.6 |
| 08001 | 12 | V | 500 | 31 | 0 | 0 | 4.4 | 0.2 | 0.0 |
| 08508 | 12 | V | 500 | 22 | 0 | 0 | 6.5 | -1.2 | 0.6 |
| 08594 | 12 | V | 500 | 28 | 0 | 100 | 4.3 | -1.3 | 1.2 |
| 71600 | 00 | V | 500 | 30 | 0 | 0 | 3.7 | 0.3 | 0.2 |
| 71600 | 12 | V | 500 | 31 | 0 | 0 | 4.4 | 1.1 | 0.5 |
| 72201 | 00 | V | 500 | 30 | 0 | 0 | 3.7 | -0.7 | 0.9 |
| 72201 | 12 | V | 500 | 31 | 0 | 0 | 3.6 | -0.4 | 0.1 |
| 72402 | 00 | V | 500 | 29 | 0 | 0 | 4.0 | 0.6 | 1.1 |
| 72402 | 12 | V | 500 | 31 | 0 | 0 | 3.0 | 0.4 | -0.2 |
| 74494 | 00 | V | 500 | 30 | 0 | 100 | 4.1 | -1.6 | -0.6 |
| 74494 | 12 | V | 500 | 31 | 0 | 100 | 3.8 | -1.0 | 1.1 |
| 78016 | 00 | V | 500 | 30 | 0 | 0 | 4.5 | 0.4 | 1.2 |
| 78016 | 12 | V | 500 | 31 | 0 | 0 | 4.7 | 1.5 | 1.2 |

# APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

| Level (hPa) | Geopotential height (metres) |
|---|---|
| 1000 | 100 |
| 850 | 100 |
| 700 | 100 |
| 500 | 150 |
| 400 | 175 |
| 300 | 200 |
| 250 | 225 |
| 200 | 250 |
| 150 | 275 |
| 100 | 300 |
| 70 | 375 |
| 50 | 400 |
| 30 | 450 |

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

| Level (hPa) | Weight |
|---|---|
| 1000 | 3.70 |
| 850 | 3.40 |
| 700 | 2.90 |
| 500 | 2.20 |
| 400 | 1.90 |
| 300 | 1.60 |
| 250 | 1.50 |
| 200 | 1.37 |
| 150 | 1.19 |
| 100 | 1.00 |
| 70 | 0.87 |
| 50 | 0.80 |
| 30 | 0.64 |

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

| Level (hPa) | Windspeed m $s^{-1}$ |
|---|---|
| 1000 | 35 |
| 850 | 35 |
| 700 | 40 |
| 500 | 45 |
| 400 | 50 |
| 300 | 60 |
| 250 | 60 |
| 200 | 50 |
| 150 | 50 |
| 100 | 45 |